

BETA

Chapter 1 An unexpected finding

Professor Lam arrived at his lab early that day. It was a Tuesday morning. And not just any old Tuesday morning. It was a Tuesday after a long weekend. He'd come to work early enough to not expect any company. As he usually did. As he preferred. He always enjoyed a little quiet time in the mornings to collect his thoughts and plan the day ahead.

Professor Lam made it a habit to let his subordinates take care of day-to-day research and hands-on tasks. Not that he was allergic to those things. It was just that nothing of interest had happened for a long time. And he was a little behind his peers with respect to number of papers published. And number of citations. And, well, a lot of other things generally important in his line of work. And, because of that, he'd decided to take a gamble on a line of research that was a bit hit-and-miss. He was hoping his gamble would pan out. If it did, he'd be in a position to author at least a few interesting papers. If not more.

Upon his arrival, Professor Lam noted that the lab's lights were off. He left them that way, preferring to work in the dark. He smiled, knowing that his lab would be suitably empty for some time. And that he'd have some peace and quiet.

He hung his coat on a small hook affixed to the wall of his office, put his cell phone on the table next to him and started to tab through the usual long backlog of emails that had arrived during his absence. After about twenty minutes, he became fatigued, and decided to take a break and stroll around the lab.

Many of the work terminals in the lab were sitting idle, either on elaborate or humorous screensavers, or at blinking command prompts. A couple indicated that processing or analysis jobs had been completed. One caught his eye. "SCAN RESULTS NOW AVAILABLE". I'll give that to one of my undergrads, he thought. He exited the lab to get more coffee.

Due to a series of unfortunate encounters with overly chatty faculty members, Professor Lam didn't return to his office for almost an hour. During his trek to the nearby kitchen, he'd been accosted and roped into conversations that he had neither the enthusiasm nor mental capacity to handle that early in the morning. He'd had to tough those conversations out to the point where he could make a graceful exit. And when he finally returned to his lab, the lights were on. He was greeted by one of his more driven undergrads working at a console he'd checked earlier.

"Morning Professor!" Jeff said as Lam entered the lab. Jeff was an undergraduate in astrophysics who'd been assigned to Lam's team that semester. He was an enthusiastic student who didn't partake in the usual drinking and partying that most undergrads enjoyed. He was almost always one of the first to show up in the morning and was pretty much always still there when the professor left for the day. Not that Professor Lam's days were all that long on average. Lam imagined Jeff spending what little free time he had reading papers or preemptively studying for the next exams. His coursework was well-researched and equally well-written. By all accounts Jeff would go on to earn a solid first and, hopefully, join Lam's PhD program.

"Morning Jeff!" he replied. "I see that scan completed over the long weekend. Are you looking at it now?" the professor asked.

“Yeah! I just opened it. We should get the visuals in about half an hour!” Jeff replied.

“Let me know if we find anything of interest,” Professor Lam replied. He went back into his office and closed the door.

During the next hour, the lab started to fill with other team members. Some of them were clearly nursing hangovers. The long weekend always invited a certain amount of revelry. And the weather had been good. All the more reason for barbecues and a just a bit of drinking. Whatever your definition of that was. Professor Lam’s wife had dragged him to such an affair the previous day. He’d have, frankly, preferred to stay in and catch up on several papers he still needed to read. But, alas, he had been forced to socialize with people he would have rather not have ever met, outside in the rather too hot weather.

After returning to his office, Lam started to browse the next paper on his to-read list. He was in the middle of it when Jeff knocked on his door. He’d been so focused that the knock startled him slightly. He gathered his composure and turned his swivel chair to the door. “Come,” he shouted.

Jeff opened the door and gingerly stepped in.

“How do those scan results look?” Lam asked.

“Umm. Well.” Jeff replied. He looked nervous and apprehensive. “It seems there was an error in our coding. We’ve found the bug and are fixing it now,” Jeff said in an anxious manner.

“A bug? Not to worry, those things happen in the course of our work. Good that you caught it,” Professor Lam replied. “So, did those scans reveal anything of interest?”

“You see, well, that’s just it. The bug caused the scan coordinates to shift a bit.” Jeff replied in a nervous voice.

“Define ‘a bit’,” Lam replied.

“We haven’t done the calculations yet, but our estimate is roughly five hundred million light years. Give or take,” Jeff replied.

“That’s quite a significant deviation. What did it mean for the scans themselves?” the professor asked.

“Well. Umm. Well, so far, the scans don’t seem to have found anything,” Jeff replied.

“These things happen in this type of research. Still, three days’ worth of scan credits to capture an empty portion of space?” Professor Lam replied. “Never a good thing. Those credits aren’t cheap. Let me come and check on the data myself,” Professor Lam replied. He got up and made his way to the door of his office. Jeff hurried over to the console he’d been working at. Professor Lam followed him.

Professor Lam's exit from his office had attracted the attention of others in the lab. Lam didn't generally spend time outside of his office, and so many wondered what had prompted his curiosity. Two of Professor Lam's PhD students got up and joined him at the console.

Jeff nervously brought up the results of the scan. He displayed the first collection image on the screen. It was completely blank.

"Okay, let's go through all of these, one at a time. If the error wasn't catastrophic, we might just be off by a little. We might still find evidence of stellar phenomena in the corner of one of these captures," Professor Lam stated.

Jeff started to click through the images. The full capture included more than ninety of them. Some of the undergraduates made their way over. Jeff slowly clicked through at least 30 images. All were blank. And it started to dawn on him that they had indeed captured an area of intergalactic void. So, as he proceeded, he started to click faster and faster. Forty, fifty, sixty. Still nothing. And then one of the undergraduates, Mary, suddenly shouted "STOP!"

Jeff stopped clicking. "Wait. Go back," Mary stated. Jeff went back one image. It was completely blank. "Okay back one more,". Jeff went back another. "Okay one more." Jeff went back another. "STOP!" she stated. She stepped forward and pointed to a spot on the screen. It wasn't obvious to the others who were watching, but what had caught Mary's eye was one or two dark gray pixels near the top-right of the image.

“Can you isolate that spot?” Mary asked, still pointing at it. Professor Lam stepped forward. Jeff stood up and let him take over. The professor typed some commands into the console and isolated the area. He zoomed in a little.

“Probably just a large asteroid or piece of debris that made its way out of a nearby galaxy billions of years ago,” Professor Lam posited.

He zoomed in further. And further. And as he enhanced the scan, what had been a few gray pixels became something nobody would have ever expected.

“Is that what I think it is?” Jeff asked. Professor Lam continued to zoom in on the image.

“Is that a spaceship?” asked Paul, one of the team’s PhD students. Lam continued to zoom in.

“Definitely a spaceship,” Mary replied.

Professor Lam entered the final calculations into Jeff’s console, producing a clear and thoroughly detailed image of the ship. “My God! From my rough calculations, this isn’t just any old spaceship. It’s huge. It must be at least one hundred kilometers in length, with a cross sectional radius of at least twelve kilometers. It is hundreds of millions of light years from the nearest star. And according to these readings, it is at a complete standstill. No velocity, no rotational velocity. Nothing.”

“Can you pan around to the underside?” Mark asked.

“Sure!” Professor Lam replied.

“Do those look like weapons?” Mary asked.

“They sure do,” Jeff said.

“Oh my god, do you know what this means?” Mary exclaimed.

“Yes, I know what this means. It means I’m going to need to make some urgent calls,”

Professor Lam stated as he rushed back to his office.

Chapter 2 Digital Representations of Non-Local Spatiotemporal Phenomena

It was a cold and stormy November evening in London. My colleagues Dr. Williams, Dr. Kallas, and I hurried towards an Indian restaurant not a stone’s throw from our lab. Although we’d only had to brave the elements for a few minutes, the wind had whipped around us in such a vigorous manner as to make the use of an umbrella strictly impossible. Rain had started to come down in sheets moments after we’d left the lab, leaving us soaked through to the bone during the short trek. We finally arrived and pushed inside. Even the door was difficult to open, what with the strong wind pushing against it.

“Could you please stop faffing about and get through that door, Riks?” Dr. Williams yelled.

“I’m trying,” Dr. Kallas replied. “The wind is really strong and it’s pushing the door...”

It was a relief to get out of the weather and into a nice, warm place. And the restaurant represented just the type of warm and inviting atmosphere we'd been looking forward to all day. A wonderful aroma of spices, smoky meats, and papadums greeted us as we entered. Sitar music was playing in the background. The place itself was bathed in traditional Indian décor. Colorful fabrics and intricate carvings adorned the walls and tables. Oddly, the restaurant was far busier than we'd expected, considering the weather and the fact that it was a weekday evening. Still, we had a table reserved, so there was no need to worry.

Despite working together every day, we'd seldom been out to eat as a group, even for lunch, of late. Our work had been extraordinarily busy, with long days and even work on weekends. Most of us often skipped lunch, only to grab a sandwich at our desks sometime in the evening. However, today was a special occasion – we had something to celebrate, and we'd all agreed that a short pause from work was well overdue.

Although the restaurant was near our place of work, we'd often opted to visit there not only for convenience's sake, but because the food was actually very good. From sampling various items over the years, I recall many dishes surpassed those served by other equivalent restaurants – a perfectly balanced korma, sweet and nutty, with a delightful cardamon fragrance, and a rich, gritty sauce; a fiery madras bathed in red oily goodness, guaranteed to require a toilet roll be left in the freezer for the next morning; fluffy, fragrant biryani cooked to perfection, layered with saffron-infused milk and crispy fried onions; and perfectly flaky and crispy rotis and soft naan breads to scoop up every last morsel of whatever sauce one had selected.

“What more to put anyone in the mood for a curry than the sound of sitar music?” Dr.

Williams noted as we took seats around a table that was set against a window in a quiet corner of the restaurant. Dr. Williams took a seat across from me and Dr. Kallas took the seat facing the window.

Dr. Robert Williams was a highly opinionated and perhaps slightly over confident physicist from Canada. He was always keen to share his views on cutting-edge physics research, and was known for being vocal in his criticisms of others' work. However, he was admired in his field and his work was widely respected by his peers. As a highly competent experimentalist, he'd made significant contributions to our understanding of the behavior of quantum inference. He'd also developed a number of important theoretical tools that are still used by physicists today. In addition to his work in physics, Williams was also a highly skilled engineer, and he designed and built a many of the innovative experimental devices that were used in our research.

Dr. Williams was unmarried and never talked about his immediate family. However, he was fond of recounting old anecdotes, in vivid detail, on countless occasions. And he was the sort of person who wouldn't let you get a word in edgeways during a conversation. I recall hours of my life that I'll never get back spent standing at the door to our lab, coat on, bag over my shoulder, trying to leave for home, while listening to one of his prolonged and extremely familiar monologues. Still, he did good work, had plenty of novel ideas, and contributed more than his fair share to our department, so we put up with that side of his personality, as much as it sometimes drove us mad.

Dr. Riiks Kallas was a materials engineer from Estonia. He was pragmatic and sometimes slightly verbose. Dr. Kallas was a short man who always dressed in a more than casual manner. His ill-fitting jumpers all contained holes and we'd often wondered whether he'd actually purchased any new clothes during the previous two decades. His hair was scruffy and uncombed, and tended to stick up in a multitude of directions without the assistance of a single hair product. He wore small circular shaped glasses.

Dr. Kallas was the sort of person who was always looking for a better way to do things. He was always tinkering with things and making new widgets. Dr. Kallas acted as a filter for Dr. Williams and was one of the few people able to get Dr. Williams to change his opinion on a subject, consider a different research path, and to sometimes even climb down from his high horse. Although Dr. Williams often angered Dr. Kallas, I noticed that Dr. Kallas was, to a certain extent, immune to Dr. Williams' arrogance. I admired his patience in that respect. The two worked well as a team, and I feared for the day when one of them might be assigned to a different department or faculty.

As for me, I'm Dr. John Stall. I jumped on the QUERY bandwagon because I happened to be in the right place at the right time. And so, you might also consider me an astrophysicist. I'm the only Brit in the team. I'm a generally quiet guy. No marital attachments or romantic interludes – work has always been my passion. I ended up becoming the team lead for our project, although I'm not really sure why. Anyways, I voluntarily took up the task of documenting our research and our journey. This story is not about me. It's about all of us. Our team.

A moment after we were seated, a waiter appeared with glasses of water and menus, which he left on the corner of the table.

Dr. Kallas started our conversation in a loud, over enthusiastic voice. “What do you expect the public will think of our findings?”.

Dr. Williams immediately replied with a “Shh! We can’t discuss this stuff outside of the lab!”.

“Oops, sorry,” replied Dr. Kallas in a whisper.

To be honest, given the intensity and long hours we’d been putting in, and the excitement we were all feeling about our recent findings, it was almost impossible to think of another topic of conversation.

Rain pattered against the window adjacent to where we were seated. The occasional strong gust of wind caused the window’s frame to creak. The storm outside was, evidently, gaining momentum and I wasn’t looking forward to the walk home. We sat there in silence for a moment considering alternative topics of conversation.

Eventually, Dr. Williams picked up the menus and handed one to each of us. We pored over them for a moment. The waiter returned to take our drinks order. “I’m not planning on returning to the lab this evening. Bring on the beers!” exclaimed Dr. Kallas. We all concurred.

The brief pause had given me time to reflect upon a new topic of conversation. “Remember that time we were all here over a decade ago? When Robert brought up the fact that he disagreed with Kenkichi’s paper and its findings?”

“Yes! I remember that!” exclaimed Dr. Kallas with a beaming grin.

Dr. Williams, looking less than amused, crossed his arms. “Could you guys cut it out with that story already? It’s factually incorrect on several counts. For starters, that’s not even close to how it went. I didn’t disagree with the paper, I was merely... mildly skeptical.”

“Mildly skeptical?!?” exclaimed Dr. Kallas. “Do you remember your exact words?”

“Not exactly, no. And besides, you two wouldn’t have even heard about the paper if it wasn’t for me,” Dr. Kallas protested.

“We only found out about it because you felt the need to poo-poo it and call it pseudoscience,” Dr. Kallas retorted. “And if you’ll recall, I was in full agreement with the paper’s original findings.”

The conversation I had alluded to had indeed taken place in the very restaurant we were in. Possibly at the very table we were sitting at. Long story short, more than a decade prior a team of physicists, led by Professor Ichida Kenkichi at Hokkaido University, built a device capable of visualizing non-local quantum spacetime. It took the team three years to build and refine the apparatus, run experiments, and publish their first results. Although many physicists, including Dr. Williams, considered their publication and the nature of their

findings less than credible, two other research teams eventually secured the funding required to reproduce their experiments, after which Kenkichi's initial findings were not only validated, but improved upon.

The paper published by Kenkichi et. al., entitled "Digital Representations of Non-Local Spatiotemporal Phenomena", would change the world as we knew it. The paper's abstract stated that, "The ability to digitally represent and observe non-local spatiotemporal phenomena opens up new avenues of research and applications in various fields. Here we report the first experimental demonstration of quantum emergence relational telemetry, which can be used to deterministically construct digital representations of any desired location in spacetime." The paper went on to outline, in detail, a mechanism that was able to render realistic three-dimensional images of any location in the universe via a form of quantum entanglement that allowed one to establish a relationship between any two individual points in spacetime.

Truth be told, whilst Dr. Kallas had been in agreement with Kenkichi's findings and I had aired reservations about them, Dr. Williams' position had been somewhat more negative. If I recall, his exact quote at that time had been something along the lines of "I can't believe they allowed such pseudoscientific nonsense to be published. And this paper was peer reviewed? My ass!"

Dr. Kallas continued. "If Kenkichi's findings hadn't turned out to be valid, we wouldn't be doing what we're doing now."

We all nodded in agreement.

A waiter carrying a large tray of balti bowls arrived at a table next to us. We all stopped what we were doing and turned to watch as the food was delivered. The sizzling cast iron pans put out a billow of smoke that wafted across our table. I made a mental note to order whatever that was and checked the menu for the appropriate item.

“I still don’t think the public has fully grasped how groundbreaking this technology is,” I replied. “And if the scientific community had been skeptical upon reading Kenkichi’s original paper, the general public almost didn’t notice it at all.”

The waiter returned to our table with three pints of beer. He took our order which, given how hungry we were, amounted to almost everything on the menu, plus another round of drinks in advance.

Dr. Kallas continued the conversation. “I don’t think people understand how much QUERY has changed the way we approach astronomy. All of us around this table know how this stuff used to work. In the 90’s, we’d point Hubble at a particularly dark spot in the sky and let it capture for weeks on end, only to get a rather blurry photograph of about 3000 distant galaxies. Sure, that picture improved into the 21st century. But most of the night sky is unsuitable for that task and a great deal of our local neighborhood is obscured by the Milky Way, so we’ll never see it with conventional telescopes anyway. And even if we could see it, it would take a million odd years of telescope readings to map our entire night sky. QUERY allowed us to bypass all of that in an instant.”

QUERY "QUantum Emergence Relational telemetrY" - was name given to the technology by its creators.

Dr. Williams continued the conversation. "Agreed. But what's more exciting for me is our ability to observe things outside of the observable universe. The part of the universe visible by way of distant photons reaching our planet, is, what, approximately ninety-three billion light years in diameter. Contrast that to the estimated diameter of the entire universe – some twenty-three trillion light years and you'll appreciate how QUERY opens so much more explorable space."

"Yeah, but why bother with the unobservable part of the universe when there's so much to explore close to home?" I replied. "We estimate the number of galaxies in the observable universe to be roughly two trillion. There are roughly one septillion stars in the observable universe. From the perspective of searching for extra-terrestrial life, intelligent extra-terrestrial species, or advanced technological species, this number suggests that, even with QUERY technology at our disposal, the chances of finding such might still be significantly less than winning the lottery, depending on how prevalent the phenomenon turns out to be."

"We've automated a lot of that, though," replied Dr. Williams.

"I agree, we have. But with what just happened today, aren't you the least bit excited about being part of those new discoveries?" replied Dr. Kallas.

"Not to diminish the discovery, yes it was interesting. However, what I'm really interested in is the discovery of something that will advance science on this planet," said Dr. Williams,

while finishing his pint. “Some proof to a problem we haven’t yet solved, medicine we haven’t discovered, or perhaps some piece of technology slightly more advanced than our own.”

I, too, had just dregs left in my glass and came to the realization that not talking in public about the thing we shouldn’t be talking in public about was going to become increasingly difficult the more beer we consumed. Not that I imagined anyone around us was listening into our conversation. But we had all signed NDAs and were bound by them on rather strict penalties. I once again attempted to steer the conversation away from our current research. “Weren’t we all undergrads when Kenkichi published?”

“Final year masters students, perhaps?” replied Dr. Kallas. “First year PhD at most, I would guess.”

“Ahh yes. The good old days,” said Dr. Williams. “When we had the ability to join projects and receive funding from our nearest neighbors. What do we have now?”

“Prosperity, unity, and sunlit uplands?” Dr. Kallas replied.

“What we have now is emboldened anti-science, anti-logic, post-truth irrationalists running around, sending us death threats,” Dr. Williams replied.

“Irrationalists,” I replied. “Irrationalists, perhaps?”

“Irrationalists. That’s an apt designation,” Dr. Kallas replied.

“I like that. There are so many groups out there. QAnon cultists. Nationalists. Anti-vaxxers. Post-truthers. Those weird gun-toting patriot militias. But they’re all the same, regardless of region, nationality, or core belief. Irrationalists works for me,” Dr. Williams stated.

“Irrationalists it is, then,” Dr. Kallas replied.

“I like that,” Dr. Williams replied.

“Me too,” I replied. “That’ll be our go-to definition from now on.”

The conversation was interrupted when several waiters appeared at our table with trays of food. We watched as they took turns locating empty spaces to place each dish. By the time they were done, there was almost no room left for our plates, cutlery, or pint glasses. After the food had arrived, the political conversation ended as abruptly as it started. We all tucked in.

The food was delicious. The korma was, as always, spot on. The madras, too. It was as fiery as I’d hoped. The biryani was cooked to perfection. The rotis and naan were crispy and fluffy in all the right places. But the balti was something else entirely. The sauce was unlike anything I’d ever tasted. It was rich and creamy, with a complex depth of flavour that was both earthy and subtly sweet. It clung to the chicken and vegetables like a second skin. And, perhaps most importantly, it had just the right amount of heat – enough to make your lips tingle and your eyes water, but not so much that it overpowered the other flavours. In short, it was the best balti I’d ever had. And the others concurred. There was much contention over

the dish and Dr. Williams, as per usual, complained that we'd hogged it and he'd only managed to get the dregs from the bottom of the bowl.

The conversation, which had been on pause for several minutes as we ate, was eventually restarted by Dr. Williams, with his mouth full of biryani. "You know, it occurs to me that this whole scientific journey should be documented in some layman-friendly format."

"I've been keeping fairly detailed notes," I replied.

"Are you planning on writing them up?" he replied.

"Yes. I was considering it," I said, reaching over for the chutney tray.

"You're going to want to be careful with that," Dr. Williams replied.

"Of course, I will make sure to omit anything we're forbidden to disseminate on the basis of the NDA," I retorted.

"Not just that," Dr. Williams replied. "Merely documenting procedure and findings will never get you anywhere. Such a manuscript will be deemed boring and unpublishable. Take it from me – I've tried."

"That was probably a reflection of your unexciting, sterile, academic writing style," Dr. Kallas replied.

“Unexciting?!!?” Dr. Williams objected. “Sterile?!!? Speak for yourself!”

“I was thinking of taking a different approach,” I interjected, hoping to diffuse the incoming argument before it started. “I’m not thinking of writing a paper. I was considering writing a book. A longer account, but without all the facts, figures, and dull scientific details.”

“That would be an interesting read,” Dr. Kallas replied.

“The story might not be all that interesting so far. However, I’m inclined to believe that, down the road, and as this technology improves, we’ll make more interesting discoveries. The book should get better as it goes on,” I added.

“You’d have to imagine so,” Dr. Kallas replied. “We’ve barely scratched the surface of what this technology can do. What if we do eventually happen upon some amazing discovery? Like alien ships. Or a star gate. Or an ancient and advanced alien race.”

“You’ll want to start your book with something gripping. An explosion. Or a car chase. Or a torrid love scene,” Dr. Williams added.

“I’m pretty sure this field of research doesn’t include a single activity that would lead to a torrid love scene,” I replied.

“Indeed!” Dr. Kallas replied. “And besides, it’s the journey that will be interesting. We might not ever reach an end goal.”

“And what would your end goal be?” Dr. Williams asked. “Discovery of Warp drive? Transporters? Holodecks?”

“Isn’t that what we’ve all been dreaming about since this technology was created?” I replied.

“Exactly,” Dr. Kallas stated. “And I believe that finding a race that wields those technologies is now within our grasp. It’s almost inevitable.”

“Speak for yourselves,” Dr. Williams replied. “That stuff is made-up. Pure science fiction. My hypotheses will be vindicated when we learn that none of those technologies are even remotely possible. If they were real, we’d have already been visited by aliens.”

“And what’s to say we haven’t?” Dr. Kallas replied angrily.

“Ah, come on! Enough with your Area fifty-one crap!” Dr. Williams objected. “Next you’ll be telling us that Stonehenge is an ancient supercomputer, or that we’re being studied by AI-driven probes that have been here since the dawn of humanity!”

A strong gust of wind blew against the side of the restaurant, rattling the windows next to us so vigorously that we stopped to peer outside. The rain was pouring down even harder at that point.

“I wonder if it’ll ease up any time soon?” Dr. Kallas wondered.

“I hope so. I’m dreading the walk home,” I replied.

“My trousers are still completely soaked,” said Dr. Williams. “Perhaps we should stay here at least until they dry out. Have a few more beers in the process.”

“Yeah,” Dr. Kallas replied. “And then they’ll get soaked again as soon as we leave this place.”

“You never know,” Dr. Williams replied, “the rain may have eased up a bi...”

And just then, while we were gazing out of the window, a bright flash filled the streets outside. Followed by a thunderous bang. My first thought was that we’d witnessed a lightning bolt strike somewhere close by. But we’d neither seen nor heard any thunder or lightning that evening. As we sat and looked out of the window, the blinding flash subsided into an orange glow. And then the street outside filled with smoke, which was quickly blown away by a strong gust of wind.

A momentary hush fell across the restaurant. People on tables around us got up to look outside. A couple of the waiters joined them. Talk of an explosion followed in the ensuing hubbub. One or two of the tables quickly settled their bills and left in a hurry. However, contrary to what you see on TV or in the movies, there wasn’t any panic, screaming, or people running around like headless chickens. Momentary surprise. Intrigue. Perhaps some shock. Those emotions were all present in the ensuing atmosphere. But just for a moment. And it all subsided rather quickly.

“I’m also thinking that might have been an explosion,” Dr. Kallas posited, “and if it was, it was either very large, or rather close.”

“You’re probably right,” I replied.

“There you go!” Dr. Kallas exclaimed. “Material for your first chapter!”

Dr. Williams and I laughed. Although, to be honest, Dr. Kallas had a point. Material indeed.

“From its direction, it could well have been near our lab,” Dr. Williams speculated.

“Perhaps we should go and see what happened?” said Dr. Kallas.

“Are you sure about that? I can think of any number of reasons why we shouldn’t just go running towards an explosion,” Dr. Williams replied. “And besides, weather notwithstanding, I’m not even finished eating.”

The rain outside started to pour down even harder.

“Robert has a valid point,” Dr. Kallas replied.

I also had a gut feeling that the explosion might have come from our lab. “Yes, the weather outside is atrocious. However, we might want to go and check if we still have a place of work to go to tomorrow,” I replied.

Dr. Kallas looked up abruptly. “I left my laptop there. I don’t think I backed up my research notes before we left. Yes. Yes, we should go and see what happened.”

“Aha! You see, that’s why I always carry my laptop with me!” Dr. Williams retorted, lifting his backpack above the table line.

Dr. Kallas crossed his arms. “Good for you, Robert,” he replied, “but that doesn’t change my predicament.”

“Alright, alright. Let’s agree that we’ll head back to the lab after we’re done here,” I replied.

The commotion in the restaurant started to die down and many who had chosen not to leave had sat back down and were continuing with their meals and conversations. We did the same.

I don’t recall the exact details of the ensuing conversation aside from the fact that it was dominated by speculation of what might have caused the explosion. Oh, and an order for another round of drinks. We finished eating and I attracted the attention of a nearby waiters who came over to our table.

“We’d like to pay our bill,” I informed him.

“Would you like one bill, or should I split it?” he asked.

We all stared at the table for a moment, intentionally avoiding eye contact with each other. I got the distinct feeling that the other two were expecting the meal to be a freebie, especially given the amount of food they'd ordered. I let them sweat it out for a bit.

I eventually broke the silence. "I'll pay the whole bill," I replied.

"Really?" replied a shocked Dr. Williams.

"Yeah, I got the go ahead from McTavish to expense this outing before we left," I replied. Drs. Williams and Kallas grumbled under their breath. They were clearly not amused at the fact that I'd made them worry about their personal budgets.

"There's a lot left. We should take the rest of it with us," Dr. Williams suggested.

"Seriously?" I replied.

"From the standpoint of not wasting food, it makes a lot of sense," said Dr. Kallas.

"From the standpoint of not wasting food, it would have made sense if the both of you hadn't ordered so much in the first place!" I replied.

Dr Kallas and Dr. Williams looked at each other. Dr Kallas started to reply. "Yes, yes..."

Dr. Williams finished his thought. "...we were sort of expecting to be able to take some of this with us."

“Okay, we can take it with us, but I’m not carrying any of it.”

“Deal!” Dr. Kallas replied.

The waiter returned to our table. I gave him my credit card and he processed the payment. I then informed him that we’d be taking the food with us. We finished up our beers as several waiters packed the remaining food into aluminum containers. And then we left the establishment.

The moment I stepped outside, rain whipped violently around me. I pulled my hood over my face as far as I could and walked hastily in the direction of our lab. My colleagues followed, food bags in tow. Nobody said a word as we fought through the wind and rain. A few minutes later we turned the corner onto the street where our lab was located. Blue and red lights from emergency vehicles flashed against nearby buildings in the distance. We stopped to survey the scene. Burning debris was strewn about the road. In the distance, through the wind and rain, we could vaguely make out a large crater in the road. The explosion was, as we’d feared, close to our lab. We pushed forward until we were stopped by a policeman.

“I’m sorry, gents, but I’m going to have to ask you to turn around. The area ahead is not safe and we’re in the process of cordoning everything off,” he said.

“But that’s our place of work. I need to get my laptop,” replied Dr. Kallas.

“You won’t be getting in there tonight, I’m afraid,” the police officer replied.

“Can you tell us what happened?” Dr. Williams asked.

“I’m sorry, mate. I know about as much as you do. But even if I did know more, this is an ongoing investigation, and I can’t tell you anything. I suggest you turn around and head the other way,” the police officer replied.

From our vantage point it was impossible to tell whether our lab had been caught in the blast. The explosion clearly hadn’t originated there, but from the size of the crater in the road, I feared the worst. And from the expressions on my colleagues’ faces, I gathered they also did. We reluctantly turned back and pushed through the wind towards the nearest tube station. We’d have to head home and find out more in the morning, as frustrating as that notion was.

Chapter 3 QUERY

Two years after the invention of QUERY, I was granted a postdoctoral research position at Imperial College, London, on one of the first teams to use the technology. Our mandate was to use the device to study phenomena in distant galaxies. Dr. Kallas, who was a member of my team, was assigned to teach an undergraduate course on the technology. I once sat in on one of his lectures and still recall his layman-friendly description of the technology quite clearly.

“In order to understand how QUERY resolution works, consider the following oversimplified analogy,” he stated.

“Imagine you're in a very large, very dark room. In front of you, some distance away, is a wall with a very detailed map of the universe inscribed on it. You have a flashlight. Turning on the flashlight and pointing it at the wall allows you to see part of that map. At a distance, you won't be able to make out much, and what you will be able to see will be dimly lit. That description represents the first iterations of QUERY,” he continued.

“As improvements are made to the technology, they allow the observer to take a step or two closer to the wall, revealing a smaller portion of the map, but more brightly. As more improvements are made, the observer can step closer and closer to the wall, illuminating more detail in an even smaller area,” he added.

“It is hypothesized that the technology might eventually be improved to the point at which the observer can essentially use a laser and microscope to observe the nature of the matter the wall is composed of,” he stated.

“The first QUERY devices were able to capture an area of about 100,000 light years in diameter. We denoted these EPOCH1. They gave us the ability to observe any portion of the universe at about twice the magnification that we'd been able to view our own galaxy using the specialized space-borne probes and telescopes of that era,” Dr. Kallas continued.

“Key future goals in the development of QUERY, are categorized as EPOCH2 with a diameter of one light year, or the ability to observe a solar system, EPOCH3 with a diameter of roughly a million meters, or the ability to observe a planet as if in orbit, and EPOCH4 with a diameter of one meter, or the ability to observe objects as if present in person. Higher resolutions denoted by EPOCH5 and above, if attainable, will enable extended uses, such as

microscopy, crystallography, medical imaging, and perhaps even assist with the study of sub-atomic physics,” he added. “Questions?”

“What do QUERY devices look like?” one student asked.

“QUERY devices are very large,” Dr. Kallas replied. “They need to be housed in a large space, require a great deal of power, and parts of them need to be cooled using not just liquid nitrogen, but liquid helium. Those are temperatures of around minus two hundred and sixty-nine Celcius, or very close to absolute zero. Operating and maintaining QUERY apparatus requires a round-the-clock team of experts, and a considerable budget.”

“QUERY sounds like a telescope. Does it use a dish? Does it need to be pointed at the location to be scanned?” another student asked.

“QUERY devices don’t utilize a dish. They don’t physically need to be pointed in a direction. We use software and internal directional vectors to point and focus them on a location,” Dr. Kallas replied.

“Do QUERY devices generate these colorful, detailed images and videos by default?” another student asked.

“Not by default,” Dr. Kallas replied. “QUERY captures data from spherical three-dimensional regions of space. Generating images from collected data involves pointing a virtual camera at the scene and reconstructing the image from that viewpoint. We need to collect data over several days and then run it through supercomputers to decipher it. We then

apply interpolation and machine learning algorithms to that noise to generate the fancy images you see in papers. And on the television.”

Less than three years after the first QUERY EPOCH1 devices had been invented, a new and vastly better QUERY device was built on our campus. It was, at the time, the highest resolution device available at any facility in the world and was able to capture detail many orders of magnitude greater than our old device could. Considering the wall and torch analogy, if our old device placed us two meters from the wall, the new device put us just a few centimeters away. For the first time in the history of this field, we had constructed a device capable of observing individual solar systems. QUERY EPOCH2 had been born.

QUERY EPOCH2 devices contained a variety of new and upgraded features such as spectroscopic analysis, much faster data capture, and superior stabilization capabilities. Capturing a fully representative dataset with EPOCH2 took less than half the time of the original EPOCH1 devices.

Shortly after the development of the first QUERY EPOCH2 device, a large-scale survey of our galactic neighborhood was proposed, the goals of which were to map and observe solar systems in nearby galaxies. The project was named SCOPE – Stellar Cartography On a Planetary Extent. Cooperation for the SCOPE initiative was achieved on a global level, involved hundreds of research teams spread across dozens of both private and academic organizations, and drove the funding of dozens of new QUERY EPOCH2 devices.

Dr. Kallas was one of the founding members of the SCOPE project. Automation of QUERY was a passion of his, and so we left him to squabble amongst the other research groups

involved in the project. Apparently, he enjoyed it. After several months, technical members of the project arrived at an agreement on how to automate the process of mapping the stars in detail. Dr. Kallas was very excited about the outcome, and when everything was settled, he presented the methodology to us.

“SCOPE works as follows,” said Dr. Kallas, pointing to a set of slides.

“First we predict the location of a star using models derived from galactic procession mapping”. His slide showed a picture of the Andromeda galaxy as an example. It was annotated with arrows indicating vectors associated with the movement of the galaxy, and of stars within the galaxy.

He changed the slide. “Next, we perform a low-resolution QUERY scan pointed at the predicted location of the star. Low resolution inference is fast, but not accurate. It allows us to determine whether the star is where our prediction models think it is. Model predictions aren’t always all that accurate, and a non-negligible percentage of those predictions fall into interstellar void, so it doesn’t make sense to burn a resource and time-intensive high-resolution scan on finding a star. Some prediction failures are the fault of the model. Others happen because a star has gone supernova. In rare cases, the predicted location contains multiple stars in a binary or trinary configuration.”

I recall watching Dr. Kallas’s presentation with interest. From what I could tell, Dr. Williams seemed almost completely uninterested.

Dr. Kallas switched to his next slide and continued. “Once a surveyed location is deemed interesting, a second observation is recorded, at a much higher resolution. This is where we spend significant QUERY cycles to collect and process data and feed results into a series of post-processing modules designed to classify various observations and flag interesting phenomena.”

“All collected data is recorded in a central repository and alerts are issued if certain criteria are met,” Dr. Kallas noted. “Essentially, if something interesting is found, a researcher will receive the alert and be tasked with manually analyzing the resulting data. A human-in-the-loop process.”

It was a short presentation, but to the point. From what I could tell, the process was suitably robust, but very much reliant on current algorithms for determination of whether a star is present in a QUERY scan or not. I expected Dr. Williams to nitpick every last detail of the presentation, but to my surprise, he had no questions or objections. I then wondered if he’d paid the slightest bit of attention to it at all.

According to Dr. Kallas, QUERY EPOCH2 was the ideal starting point for SCOPE for a few reasons. Naturally, the higher resolution available in those devices allowed individual solar systems to be examined and provided resolutions that could be used to identify moons, rings, asteroid belts, and synthetically constructed objects. Also, the spectroscopic analysis capabilities of EPOCH2 devices allowed celestial bodies to be examined qualitatively for atmospheric composition and color, which was necessary to identify potential habitable or inhabited planets.

During that time, we were also briefed on a new SETI project involving QUERY. I recall a presentation on the subject by Kano Nara, a visiting undergrad who was writing her Master's thesis on the subject.

“SETI, or the Search for Extra Terrestrial Intelligence, is a series of long-running projects designed to search for signs of intelligence in the universe,” Kano explained.

“Most pre-QUERY SETI approaches rely on the analysis of radio signals collected via large arrays of ground-based radio telescopes,” she continued. “SETI has yet to detect a signal that might be attributed to extra-terrestrial intelligence. This is largely because the effort has been underfunded and equipment is likely not powerful or sophisticated enough to do its job properly.”

The SETI 2.0 project was our first interaction with Kano Nara, who was, at that time, an undergraduate from Kyoto University. She was clearly both brilliant and a creative young soul. Although we were highly skeptical about the SETI 2.0 project, Kano Nara's presentation provided much food for thought.

Kano Nara was remarkably short, measuring less than one hundred and fifty centimeters in height. She usually dressed in flowy, billowing, light-colored blouses, skirts made of natural fabrics like linen and cotton, bright scarves, and colorful, patterned socks. Her attire was commonly accessorized with ornate jewelry and delicate, small clutch purses. She almost always wore her hair in two thin, low pigtails styled with pink and yellow ribbons.

“QUERY EPOCH1 devices, due to their low resolution, aren’t suitable for SETI’s purposes, since signs of extra-terrestrial intelligence simply can’t be observed at those scales,” Kano stated. “The equipment itself is also expensive, rare, and fully allocated to other research efforts, and thus not suitable for SETI.”

I noted Dr. Williams’ ambivalence on the subject. He pulled out his phone and started to browse.

Kano continued. “However, during the transition between EPOCH1 and EPOCH2, it has been suggested that QUERY might be used to look for signs of highly advanced extra-terrestrial civilizations. This hypothesis is based on the Kardashev scale”.

Dr. Williams continued to browse his phone and not pay the slightest bit of attention to Kara’s presentation.

“The Kardashev scale, a purely hypothetical construct designed to attribute levels to civilizations based on their power usage, is defined as follows,” Kano stated. “Type I civilizations are capable of harnessing all the energy reaching their home planet from its parent star. Type II civilizations are capable of harnessing all the energy radiated by their parent star, and Type III civilizations are capable of harnessing all the energy generated by their host galaxy. Our own civilization has yet to reach even the Type I definition. And we haven’t witnessed any indicators of activities indicative of Type I, II, or III civilizations. Our hopes are that QUERY might direct us toward those.”

“For a Type II civilization to harness all the energy of its host star, it would need to build space-borne megastructures that could potentially be detected with relatively low-resolution QUERY observations,” she stated. “A Dyson Sphere - a megastructure encompassing an entire star designed to collect solar energy is a structure that would signify the presence of a Type II civilization.”

I heard Dr. Williams, who was seated next to me, quietly and sarcastically comment under his breath. “Ahh yes. Kardashev scale. Dyson Spheres...”

Karo continued her presentation. “As you move up the Kardashev scale to Type III, other potentially observable phenomena are possible, such as large space-borne shipyards, space stations, artificial planets, stargates, wormhole generators, star ship fleets, or any number of previously unimagined space-borne megastructures. These types of artifacts would be easily detected using QUERY EPOCH2 and better devices.”

“If only we’d found any examples of what she’s talking about in the literally thousands of scans we’ve already analyzed...” Dr. Williams commented.

The idea that QUERY EPOCH 2 and above might enable us to find advanced aliens had crossed our minds when the technology had been first discovered. However, there were many philosophical and theoretical questions regarding this line of thinking.

“A Type II civilization would have thousands of years of technological advancement on our own. It is therefore likely that such a species may already know about us and may perhaps be

watching us already. An all the more likely proposition since QUERY was invented,” Kano continued.

“Previous thinking was that by the time we had developed probes or ships capable of exploring the universe in search of such species, they would have had the means of preventing us from observing them or making contact with them. QUERY has changed that notion. SETI 2.0 could provide mankind with excitement that, given our newfound ability to observe any region in the known, or unknown universe, in real time, without leaving our planet, we might now have the chance of discovering Type II or Type III civilizations without the massive technological leap it would have otherwise required to build the technology and space ships to get there, and without the danger of physically intruding on their territories,” Kano added.

“SETI's use of QUERY data alleviates another problematic premise of the original SETI methodology - its reliance on the detection of radio signals,” Kano continued. “Considering our own technological advancement, it seems increasingly likely that a civilization might only utilize radio-based technologies for a brief period of time – perhaps just a few hundred years. Given the distances to even the closest potentially habitable planets, we’ve probably missed that brief window of opportunity to detect a civilization during its radio age. By using QUERY data provided to us by the SCOPE initiative, SETI is granted a new lease of life, and one we would ultimately expect to yield results.”

Kano Nara’s presentation was, in my opinion, impressive. I believe Dr. Kallas also shared that opinion. Dr. Williams, on the other hand, looked decidedly bored during the proceedings. As respected practitioners in the field, we’d already considered many of Kano’s notions. But

to see an undergrad present such ideas was notable. My thinking was that Kano Nara was someone we'd need to recruit to our team, eventually.

I recall conversing with Drs. Williams and Kallas after Kano's presentation.

"I'm still not convinced that the SETI project, in any form, is of use to the scientific community," Dr. Williams stated.

"But this new incarnation of the project seems well-founded," replied Dr. Kallas. "They'll piggyback on SCOPE data. And more eyes on that data is never a bad thing. Especially if they're viewing it from a slightly different angle."

"What I'm trying to get at is that any species advanced enough to have built Dyson spheres and warp drive would probably have a way of shielding themselves from QUERY scans. I'd expect us to eventually find civilizations comparable in technological advancement to our own. But not anything even slightly further along. Unless it is physically impossible to block or disrupt QUERY measurements, in which case it would only seem logical that now be the appropriate moment they make contact," Dr. Williams replied.

"And yet they haven't," replied Dr. Kallas.

"It sounds like we're invoking the Fermi paradox," I replied.

In the mid-20th century, the Fermi paradox, named after physicist Enrico Fermi, was postulated: given that there are billions of stars in the Milky Way, there is a high probability

that Earth-like planets orbit at least some of them. Since many of the stars in our galaxy are much older than our own star, if life had formed on a planet orbiting one of those stars and evolved intelligence, there is a high probability it would have happened a very long time ago. Given our own technological trajectory, we must assume that some of these intelligent lifeforms would have gone on to develop interstellar or even intergalactic travel capabilities. Given this hypothesis, why have we never been visited by extra-terrestrials?

“Many of the unknowns of the Fermi paradox have been solved. We know that the formation of planets around stars is common, that planets orbiting within the Goldilocks zone of a star are common, that the formation of life on planets should theoretically be common, and that the rare Earth hypothesis probably doesn’t hold much water. Now that we have QUERY and SCOPE, we’ll be able to assign variables to some of the other unknowns, such as the rate of formation of life on planets and the probability that life becomes technological,” I replied.

“True. Even if life is abundant, we have no way of knowing how often it goes on to become technological in nature. Look at our planet. The dinosaurs were around for 165 million years and during that time no technological species evolved that we know of. Perhaps the process of evolution doesn't strive for intelligence if it is not needed,” Dr. Kallas added. “We also need to factor in things like natural extinction events – large meteors, volcanic activity, gamma-ray bursts and self-annihilation from nuclear war, climate catastrophe, biotechnology, nanotechnology, or resource depletion. QUERY might allow us to find dead worlds where such things have happened.”

Dr. Williams folded his arms and leaned forward. “As much as I’m enjoying your recap on decades old scientific theory, I’m wondering what it has to do with my hypothesis,” he interjected, with more than a mild tone of sarcasm.

“Okay. So, we know QUERY is possible. We have developed it ourselves. We also agree that many other technological species must have evolved on planets in our galaxy. And logically, many of them evolved a very, very long time ago,” Dr. Kallas replied.

“Which means that most of them have probably been watching this planet and watching us evolve over millennia. Yeah, yeah. It doesn’t take a rocket scientist to deduce that,” Dr. Williams replied.

“Which means that we’re either a zoo planet or a laboratory planet,” I added. “It also accounts for why we’ve never been visited by aliens. They don’t need to visit if they have us on their televisions twenty-four seven.”

“In would refrain from saying those things in public,” replied Dr. Williams.

“What things?” I asked.

“That we haven’t been visited by aliens. You know how well that sort of talk is accepted in our post-truth society,” Dr. Williams replied.

It was true. People had always believed we were being visited by extra-terrestrials even though proof of alien visitation largely relied on theories with no solid evidence or proof.

Some theories suggested government involvement or coverups. Others tried to link aliens to unexplainable phenomena, such as crop circles. But incontrovertible evidence of their existence had not yet been produced. The membership of groups believing in such conspiracy theories grew rapidly following the creation of the Internet. Those groups subsequently invented a whole range of new conspiracy theories and notions covering topics such as a global New World Order, reptilians living at the center of the Earth, microchip implantation, orbital mind control lasers, and all manner of other far-fetched ideology. Some of the more prominent influencers in these groups would go on to become useful idiots for what we termed the irrationalist movements of the early 21st century.

“It is true that the creation of QUERY turned the Fermi paradox on its head,” Dr Williams said. “Space exploration was largely invalidated by it. And I’d bet that to be the case for every species who invented it. Which is why I think SETI 2.0 is a waste of time. Once people discover it, they’ll simply stop building spaceships.”

“Yes, I completely understand your point with respect to our species. But have you considered the possibility that some distant extraterrestrials might have created an artificial superintelligence?” replied Dr. Kallas. “It might be that us humans never feel the need to build a Dyson sphere. But you can be sure it is something a superintelligence would do.”

“The very idea of artificial superintelligence is highly speculative,” Dr. Williams replied. “Given what we’ve already spoken about, if it were possible to create an artificial superintelligence, it would have been created hundreds of thousands of years ago. Maybe even hundreds of millions of years ago. By the first technological species to make it past the extinction barrier. And if that were the case, we’d not be sitting here having this conversation.

Our planet, star, solar system, and perhaps even entire galaxy would have been assimilated eons ago.”

“You have a point,” I replied.

“But artificial superintelligence seems like a rather logical and guaranteed outcome from the development of artificial general intelligence. And we’ve all read recent papers coming from the artificial intelligence fields. They’re all predicting we’re just a few years away from creating it. If that is true, other alien species must have already created it. And, as Dr. Williams stated, likely a very long time ago. So why ARE we all still here?”

“Perhaps there’s some all-powerful alien race out there watching everything and destroying AGI as it is created?” replied Dr. Kallas. We all chuckled at the notion.

“If that’s the case, our planet might only have a couple of years left,” I added. “Anyway, SETI 2.0 might go on to answer that question. If we find remnants of dead Dyson spheres, Riks’ hypothesis will be validated. And then we can all start to worry. If the artificial intelligence hasn’t wiped us all out in the meantime.”

Despite Dr. Williams’s reservations, which anyway had no influence on the decision, shortly after the initiation of the SCOPE project, SETI 2.0 was given the go ahead. The project was given full access to the SCOPE repository, and their researchers were given the ability to analyze data in search of the presence of intelligent extra-terrestrial life. Their mission was to search for artificial structures on the surface of planets, and for orbiting satellites or space stations, and anything indicative of more advanced civilizations.

Chapter 4 Murata-1A

Mankind's discovery of life outside of our own planet was not by chance – it was achieved through diligence, innovation, and scientific exploration. The fact that I'd been present during the moment of that discovery was pure chance. Sort of like winning the lottery.

Our first glimpse of extra-terrestrial life happened a little more than six months after the SCOPE project became fully operational.

It was a normal workday in our lab, and I'd arrived that morning to a list of new observations flagged for analysis by SCOPE's automation. New discoveries were quite routine, and after the initial excitement of handling them died down, I found myself delegating the work to trainees and undergrads. SCOPE's automation tended to throw multiple alerts per day, and most were rather uninteresting. After months of working with them, the process of manually inspecting data had turned into a rather dull routine. This alert, however, would turn out to be anything but dull. Or routine.

On that day, it was one of my undergrad students, Akiko Murata, who pulled that specific item from the list. She called me over. "I'm not quite sure how to process this alert."

"Okay, let's see what we're dealing with," I replied. I took a spot next to her at the console and started pulling up data. "A standard solar system configuration. G-class star, similar to our own in color and size. Inner rocky planets. Outer gas giants."

I continued to sift through the data and visualizations. “The two innermost planets appear to orbit within the Goldilocks zone. Interesting. This one, on the outer edge of the Goldilocks zone is about twice the size of Earth.” I pointed to the planet. Akiko nodded.

“It has a single moon orbiting it,” she replied.

“Yes indeed,” I noted. “Let’s see what the alert is telling us. Apparently, we’re looking at a spectroscopic anomaly.” I sifted further through the data. None of the planets appeared to have spectroscopic readings outside of the ordinary. “I wonder why this dataset was flagged with a spectroscopic anomaly. Perhaps it’s an error with the automation,” I posited.

We both looked at the data for a few more minutes. Nothing popped out as significant.

“Could the anomaly be related to something in the asteroid belt, or a moon?” Akiko asked.

We sifted through the data for a while longer until Akiko made the connection. The anomaly was indeed flagged against one of the moons in the system – the one orbiting the large Earth-like planet on the outer edge of the Goldilocks zone. We ran a few algorithms and isolated an image of the moon, allowing us to visualize what was causing the anomaly.

And there, right before us, we saw, for the first time in human existence, an image of life elsewhere in the universe. Even at a relatively low resolution, it was possible to make out blue, white, brown, and green in configurations not dissimilar to those seen on images of Earth captured from a great distance.

“Is this normal?” Akiko asked. “This is only the third alert I’ve ever handled.”

“Umm... no. This is far from normal,” I replied. “This is unlike anything we’ve encountered before.”

I stood up and took a step back. Over the previous year my team and I had manually analyzed hundreds, if not thousands of alerts from SCOPE. In not a single one of those captures had we seen anything like what we were witnessing at that moment.

“This is a potentially groundbreaking discovery,” I said. “But okay, let’s get some more images and verify what we’re looking at before we break out the champagne”.

At that point, many others in the lab stopped what they were doing and joined us to see what all the excitement and fuss was about. We all worked together to isolate dozens of additional images of the moon. And although the low-resolution captures weren't enough to allow us to reach any formal conclusions, based on what we were seeing, it was likely that the moon may contain liquid water, land, polar ice caps, and what might well be plant life.

Both Drs. Williams and Kallas were out of the lab when the discovery was made. Once we were fairly certain of what we were seeing, I called them, and they rushed in to assist. Dr. Kallas ascribed the discovery as “truly monumental”. Dr. Williams reacted with “I have a friend who has access to one of those newer, higher resolution QUERY devices. I’ll get in touch with him and get some better scans. Can I get coordinates?”, followed by clicking his fingers frantically at me.

During the following week, we contacted a number of other teams on the SCOPE project and proceeded to verifying our findings. The first thing that needed to be done was to re-examine the solar system with at least one other QUERY device. This was to rule out any faults in the device that flagged the initial alert. Dr. Williams' contact came through and we got some time their new prototype QUERY device. It took a day or two to collect data from those validation captures. Once the higher resolution capture arrived, we were able to visualize the moon in much greater detail and we started to involve additional teams in the analysis. Given the implications of the discovery, it was important that we verified our findings thoroughly before making any sort of announcement to the public.

And it was a frantic time. We worked evenings and weekends. We practically slept at the lab. But it was worth it for such a groundbreaking discovery.

We collected a plethora of new data that allowed us to generate much more detailed images of the moon, which we named "Murata-1A". But back then, even the best QUERY devices weren't able to generate images of sufficiently high resolution to determine whether any animal life was present on the moon. However, we were able to make out different shades of green, brown areas that were presumably desert or arid zones, and relief in the form of mountains and canyons. Quite large snow caps were observed on both poles. Murata-1A's oceans covered a lot less of the planet as compared to Earth, possibly due to the amount of water trapped in the poles. No lights indicative of a technological species were observed on night-time images of the moon, and no man-made structures were detected on the surface or in orbit, at least at the resolutions we had available.

Our choice to study Andromeda had paid off - the first signs of extra-terrestrial life had been discovered on a moon orbiting a planet orbiting a star in the Andromeda galaxy. A month after the discovery of Murata-1A, enough validation and peer review had taken place to put us in a position to announce it to the world.

And it was on that evening that Drs. Williams, Kallas, and I decided to take the rest of the night off and go for a curry. An evening out that was almost rudely interrupted by an explosion near our lab.

Chapter 5 Irrationalists

We met on the morning following the explosion at the time and place we'd agreed upon. The idea that we might not have a place to work had worried me all evening. Especially so because an announcement of our discovery was due to be released to the press in just a few days and there was plenty of validation work that still needed doing. Some of that work was on Dr. Kallas's laptop, which had been left in the lab. We wondered how far back losing said laptop would put us. All the way to the tube station, Dr. Williams had berated Dr. Kallas for not performing a backup. Dr. Kallas just took it and didn't say a word. But given how busy we'd been, I could completely understand his position. And anyway, it's not like we were expecting someone to bomb the place.

Thankfully, the storm had passed, and it was a pleasant and sunny, albeit cold, autumn morning. We made our way in the direction of the lab. Turning onto the street where the blast had occurred, we found that police cordons were still in effect. We walked towards them and found a helpful officer to talk to. We explained our situation and described the location of our

lab. He informed us that, although we wouldn't be able to cross the police tape in front of us, that there was probably a way of getting there via the other side of campus. We took the long detour and eventually arrived.

We'd all checked the news before leaving home that morning. Apparently, nobody was injured or killed in the blast. We attributed it, at least partially, to the foul weather of that evening.

Luckily for us, the blast had fallen short of our lab. One window had a slight crack in it, and as far as we could tell, that was the extent of the damage. Dr. Kallas found his laptop intact and still functional. Dr. Williams told him to perform a backup immediately, which he did without reservation. And so, we got back to work, apparently unperturbed by the previous days near miss.

At around lunchtime Professor McTavish, appeared in our room. Professor McTavish was a short man with a very large belly and a long grey beard. He always wore tweed jackets over intricately patterned wool jumpers. We strongly doubted he'd been able to button up his jackets for years. On a general basis, we had little contact with him. His appearances were usually heralded as anything between crushing administrative burden and a sign of the coming apocalypse. As it turns out, his visit on this occasion tended towards the latter.

"Morning gentlemen," he bellowed as he entered our lab.

We returned the greeting.

“Glad to see yer all in one piece. I trust yer evening out on our grant money was well enjoyed.”

We nodded.

The occasional waft of flatulence had pervaded our workspace that morning. Some instances had been accompanied by a discreet flapping of lab coat lapels. I first thought there was a burst drain nearby. But after the other two hadn't complained at all, I deduced that it must be them. And it was likely due to the fact that Drs. Williams and Kallas had probably enjoyed a rather hearty breakfast of champions on the curry leftovers they'd taken home with them the previous evening. I was surprised that Professor McTavish hadn't also noticed the smell as he'd entered the lab. Or perhaps he had but was simply tolerating it with a straight face.

“From what we've been told by the police, this appears to have been the work of a group calling themselves True Albion,” he stated.

“Yet another faction of the irrationalists,” Dr. Williams noted quietly.

Professor McTavish had evidently picked up on Dr. Williams' comment, even though it had been uttered in a whisper. “Aye. Leave it tae the English tae bugger everything up,” he replied. “Anyways, it's clear some buggers got wind of what we're doing here.”

“I'm here tae inform you that the administration is evaluating what happened last night. They're worried about these terrorist attacks, especially regarding the work yer doing with QUERY. They'll be making a decision this week.”

“A decision?” I asked.

“On whether tae relocate youse and yer equipment elsewhere.”

“To where?” I asked.

“Tae be determined,” Professor McTavish replied. He paused for a moment. “Oh, and that announcement you’re working towards. We’ll have tae put that off fer now.”

“WHAT?” exclaimed Dr. Williams.

“What’re yae quippin’ about? I’m gonnae have to relocate too,” said Professor McTavish as he turned and walked to the door. He paused for a moment. “By the way, the stench in here is bad enough tae wake the dead and then promptly put them back in their graves. You might wannae considering opening a windae or two from time te time.” And with that, he left. Perhaps to his relief. I had been there for several hours and could still smell it quite clearly.

“Guys, can you try and control yourselves a little in the future? You’ve gone and made McTavish comment. Who knows what sort of bollocking I’m in for next time I see him,” I protested.

“Relocate?” said Dr. Kallas. “I wonder where to?”

“I have no idea. Another facility nearby. I hope. I don’t want to up and move somewhere else,” I said.

“Me neither,” Dr. Williams replied.

We pondered the news in silence for a moment while I went and opened a window. Or two.

Dr. Kallas broke the silence. “Have you heard the latest gossip?” he asked.

“What gossip are you referring to this time?” asked Dr. Williams in his usual sarcastic tone.

“That some team in Helsinki might have solved QUERY EPOCH3,” Dr. Kallas replied.

“What, really?!” exclaimed Dr. Williams.

“Isn’t that where your contacts are?” I asked.

“No, no, no, no, no, they’re in Toronto,” Dr. Williams replied stretching his arm behind him and pointing in some arbitrary direction.

“Yeah, apparently the team in Helsinki have been experimenting with a new generation of quantum-resonant materials. According to the paper, their prototype devices drastically reduce power requirements, and remove the need for cooling, significantly reducing the size and cost of devices,” Dr. Kallas replied. “They’re still in preliminary testing stages, though.”

“We HAVE to get our hands on one of those!” I replied.

“Yeah. I’ve already reached out to them,” Dr. Kallas replied. “They haven’t replied yet.”

“Thanks for doing that,” I replied.

“An EPOCH3 device would allow us to accurately determine whether life exists on MURATA-1A,” Dr. Williams stated.

“Of course, but let’s be honest, it’s probably going to be a few years before we can get a hold of one of those,” I replied.

“But at the very least, we might ask the team in Helsinki to look at our coordinates,” Dr. Williams replied.

“I already asked them...” Dr Kallas replied, in a weary tone. “And, as I already stated, they haven’t answered.”

Given that our announcement of MURATA-1A was going to be postponed, we found ourselves, for the first time in months, not under immediate and crushing deadlines. We continued with our work but kept normal office hours. Days passed as we waited for Professor McTavish to return to our lab bearing yet more bad news. But surprisingly when he finally returned it was with good news.

“Mornin’ laddies,” he bellowed as he burst into our room.

We turned and mumbled greetings back to him. It was a bit early in the morning for any of us to display energy or enthusiasm.

“I can tell yev nae been back to the curry house,” he joked. I assume it was in reference to his previous visit. “Aaaanyways, I come bearing news.”

“Oh god, here it is,” whispered Dr. Williams.

“Well, it seems our fine men in blue have deemed us safe. The folks that blew up the bomb have been caught redhanded and taken intae custody, and they’re not expecting any further attacks. So, fer now, were staying put.”

We breathed a collective sigh of relief.

“Oh, and wait! I’ve got more good news for ye! The faculty have deemed yer research more important than they previously gave it credit for. So, yer to go ahead with yer fancy announcement. Press release. Whatever. And yer getting the budget to add another member to yer team!”

“Really?” I replied.

“I’ll leave the recruitment business to you. Just mek it quick will ye? Now back te work with youse,” said the professor as he hurried out.

“It’s always like that with him, isn’t it?” Dr. Williams complained. “Git in n' git oot quickly n' nae one’s the wiser.”

“You’ve really got that accent down,” replied Dr. Kallas.

“You must admit, Robert’s right. He never sticks around to clarify or take questions,” I replied. “But yeah, that accent is really coming along. Did you learn it solely from listening to McTavish?”

“As a matter of fact...” Dr. Williams paused for a moment, probably attempting to devise a witty retort to my question.

“He takes issue with your peer review comments?” Dr. Kallas asked.

“I’d imagine that’d be the reason you’re in his office so much,” I added.

“Would you guys...” Dr. Williams replied.

“So, we’re right, then?” Dr. Kallas asked.

“Of course, we’re right. We can’t be the only ones who’ve noticed his lack of tact,” I replied.

“So, how much time have you had to spend getting bollocked by him?” Dr. Kallas asked.

“Well, now, you see...” said Dr. Williams. Dr. Kallas and I nodded at each other. Dr. Williams never finished his sentence.

And with that short visit, we were suddenly back on track. No. More than back on track – we’d been given the go ahead to add a team member. And I knew exactly who I wanted.

As it turned out, getting Kano Nara to join our team didn’t take as much persuasion as I’d imagined. After finishing her master’s thesis, which was focused on arguments for the creation of a SETI 2.0 program, she embarked on a PhD centered around the study of artificial intelligence. More specifically artificial life.

Kano’s PhD thesis detailed work on the simulation of the chemical and biological processes that drive life on our planet. Her lab in Kyoto had created virtual environments where organisms grew, evolved, and interacted with each other in a manner reminiscent of the conditions of early life on Earth. In fact, a whole team of researchers in her Kyoto lab were tasked with studying the simulated ecosystems in detail.

I’d kept in touch with Kano after her visit and we exchanged notes from time to time. I recall her telling me that the simulated environments they’d created were unique and precious. Although everything was being simulated in software, the organisms were, from her perspective, living beings. She explained that they had to occasionally shut simulations down to upgrade them. But the organisms didn’t notice – they’d just appear where they were before the shutdown, doing the things they were doing. The shutdown didn’t kill them, it merely paused time for them. Deleting environments, she told me, would be akin to killing them. But the team weren’t planning on doing that for the foreseeable future.

Kano went on to explain that the ecosystems were designed to evolve at a much faster rate than real, living systems. Different parameters – planet size, day length, year length, gravity, atmosphere, acidity, climate, and so on – were introduced into each simulation, allowing evolution on different hypothetical planets to be modeled. As such, one of the purposes of their experiments was to study ancient Earth-based lifeforms not seen for billions of years, and lifeforms that may never have evolved on this planet. Much of the work was essentially the study of early alien ecology.

Having completed her PhD thesis, Kano Nara was now Dr. Nara. When I first contacted her with the opportunity to work with us, it was just days after our announcement of the first discovery of extraterrestrial life. This was partially strategic, and partially due to Professor McTavish's timing. Kano told me that even though she had a great affinity for her current research and a bond with the simulated creatures they were studying, she simply couldn't say no to working on our team. To her, the idea of studying actual real alien life was even more appealing than working in her current field. She explained that her work on the SETI 2.0 project had always inspired her to want to study the universe. The real universe. And so, after a few extremely interesting and thought-provoking conversations, we mutually agreed on her move to London.

The transfer process did take some time, but that was to be expected.

Dr. Nara's familiarity with artificial intelligence was a boon to our team. Although we had established some familiarity with the subject while mapping galaxies a few years prior, most of the work had been done by visiting computer scientists. Our own work was very focused

and none of us ever had the chance to read any of the myriad of newly published papers in the field. As such, when Dr. Nara joined our team, we were eager to learn about the latest advances in the field. I recall my colleagues eagerly questioning Dr. Nara during the very first lunch we had with her.

“So, I hear you’re somewhat of an expert in the field of artificial intelligence,” Dr. Kallas stated.

“I can’t admit to being an expert in the field. It has simply become too broad for anyone to have expertise in all areas. My recent work focused on artificial life, but I have kept up with some other aspects of the field, mostly for my own curiosity,” Dr. Nara replied.

“We’ve been trying one of those new hypothesis engines. I must admit that it came up with several theories we hadn’t thought of that turned out to be valid. Really cut down on our research work,” I replied.

“Those can be hit and miss,” Dr. Nara replied. “It very much depends upon the subject matter. Still, they seem to be improving.”

“Dr. Williams is very skeptical about those systems,” Dr. Kallas added.

Dr. Williams, who had clearly been paying full attention to his food, and no attention to our conversation looked up after hearing his name mentioned. “Wha huh? Oh, those hypothesis engines. Almost completely useless,” he replied.

“But didn’t one output a valid hypothesis related to your research just last week?” Dr. Kallas replied.

“Nah. It was a weak hypothesis and not even worth testing,” Dr. Williams stated.

“But I tested it myself. The results were intriguing,” Dr. Kallas replied.

“Intriguing. Intriguing? That’s your definition of good experimental results?” Dr. Williams replied sarcastically.

“How would you define ‘good experimental results’ then?” Dr. Kallas asked in a clearly unamused and slightly agitated manner.

It was clearly time to change the subject. As usual.

“Ahh, but on the flip side, there have been some unforeseen negative consequences of AI. For instance, those AI crowd control drones in the middle east that killed a bunch of protesters,” I said.

“Yeah, that was unfortunate,” Dr. Nara replied. “To be honest, automated weapons should never have been an application for artificial intelligence. But, of course, as soon as a new and more powerful military technology becomes available, leave it to governments and weapons manufacturers to exploit it.”

We all nodded.

Of course, it was inevitable that AI would be used in weapons systems. Government and military budgets were almost infinite, and AI had rapidly become a focus for spending once it had been proven to be ‘somewhat applicable’ in those fields. As much as regulations had been put in place to prevent AI being used to control autonomous military robots, their existence was inevitable. The choice was simple – adhere to regulations and face imminent annihilation from nation states who didn’t or develop them yourself. The mere viability of such weapons systems had prompted massive government AI spending and precipitated a race to AGI, or artificial general intelligence. The winner of that race would have access to a weapon many orders of magnitude more powerful than any nuclear arsenal.

“Remember the old days when self-driving cars went berserk and law enforcement tried to use AI to predict crime, only to fail miserably because of biased predictions?” Dr. Nara asked.

“Oh wow. That’s a blast from the past!” I answered.

“I’m glad those old problems are past us now. I don’t know what I’d do without my Skycruiser app and self-driving vehicles. I never bothered to get a driving license!” Dr. Nara stated.

“AI moderation is something I always imagined would have improved over the years. But it really hasn’t. There’s so much toxicity on social networks. Nowadays it mostly comes from these fascist anti-science trolls,” Dr. Nara added.

“We like to refer to them as irrationalists. We have our own brand of those idiots here. Did you have to suffer them in Japan?” I asked.

“Sure, there’s a movement in Japan. But most of the harassment I’ve had to deal with has been from the US,” Dr. Nara replied.

“Do you think AI will ever solve the irrationalist problem?” Dr. Kallas asked. “I mean, just a few months ago they tried to bomb our lab.”

“Luckily those idiots missed. By a mile,” Dr. Williams interjected.

“Did you guys do anything to provoke those groups?” Dr. Nara asked.

“Not at all. We were simply doing research. None of us really bother with social media. Although, saying that, we do all get harassed a lot. Our names are on our publications, and I suppose some fanatic has compiled a list of people using QUERY and asked every nut job out there to cause us trouble.” I replied.

“Those people are the lowest of the low. I’m very active on social media, and even our peaceful research into open-ended evolution seems to be cause for concern amongst the far right,” Dr. Nara replied. “Although, I admit I’m quite a vocal critic of their cause. I expect trouble and get my fair share of it.”

“How often do you get piled-on by those groups?” I asked.

“Constantly. But I have made it a bit of a pastime to include their most ridiculous takes on my blog. It has quite a following. And yes, it does tend to attract a fair number of replies from both the insane and the super-radicalized,” she replied.

“How do you deal with all that harassment?” Dr. Kallas asked.

“I guess I just don’t let it bother me,” Dr. Nara replied. “Social media has become this amplifier of harassment,” she said. “Instead of a few people shouting about what you’re doing or what you believe in, you have tens of thousands of people.”

“But these people are known to go beyond just bothering others on social networks,” I replied. “I mean, we all get nasty, threatening emails.”

“Oh, you’d better believe it,” Dr. Nara stated. “I’ve had them email and even call my boss, trying to get me fired. Some filed police reports against me.”

“Oh god, that’s frightening!” Dr. Kallas replied. “Did anything happen?”

“Luckily my boss ignored them,” Dr. Nara stated. “Our legal team even gave me advice and told me they’d be only too happy to fight anything that came up in court. But nothing ever did. The police don’t have the time or resources to deal with such petty crap.”

“I bet they have to deal with a lot of that,” I replied.

“Oh, for sure,” Dr. Nara replied. “Those trolls have nothing better to do than spend all their time harassing people.”

“They’re unemployed?” Dr. Kallas asked.

“Well, unemployed and unemployed,” Dr. Nara replied. “They get paid through back-channels. By the Russians, mostly. But probably also others. The Americans, Chinese, and even the British have their own troll armies. Normalized idiocy and anti-intellectualism have gotten to the point where such behavior is seen as a virtue. And this is why bombs go off and we all receive threats on a daily basis,” Dr. Nara stated. “And if you think what they’re doing right now is bad, I have a prediction you’re probably not going to want to hear.”

“Okay, this sounds ominous,” Dr. Williams stated. “Okay, let’s hear it.”

“When QUERY EPOCH4 finally becomes available, they’re going to become very brazen.”

“Why so?” Dr. Kallas asked.

“Well, QUERY EPOCH4 will enable us to view any location in the universe as if we’re there. They’ll immediately assume it’ll be used to spy on us. And while that will be technically possible, we all know there aren’t nearly enough devices or compute to realistically surveil the entire world at all times, let alone the number of people that would be needed to do that. But they don’t know that. And they’ll assume it’s possible. So, buckle up, because that’ll happen in just a few years. I guarantee it,” she replied.

As it happens, Dr. Nara and her social media expertise ended up being extremely relevant during the days after she joined us. Our announcement of the discovery of life on another world had attracted the most radical of trolls and naysayers. And we were bombarded with negative social media messages. Dr. Nara managed the situation admirably. Amongst the most amplified reactions from the far-right were comments to the tune of:

Once again, the elites are determined to undermine our sovereignty with their agenda of globalism. No to E.T.! #ETLife #AmericaFirst #LetsGoWTO

Libtards have found a planet they can sod off to. Let's hope they go there as soon as possible and leave us be. #ForGodAndCountry #wokepocalypse

They claim this is a moon. Look at our own moon. This looks nothing like it. Clearly FAKE NEWS! #LiberalLies #GlobalistAgenda

This is clearly a leftist plot. GOD created us. There is no other life out there. THEY ARE LYING! #ScumAtheists #ScumScientists #ScumMedia

This is CLEARLY a picture of Earth taken from one of our spy satellites. DON'T BELIEVE A WORD OF WHATS PRINTED! #Psyop #FakeNews

Outrageous! The elites have kept this from us. Why are they so keen to let these aliens come to our planet and disrupt our way of life?! #Propaganda #NotOnMyWatch

So, yeah, the expected reaction from the far right. Fortunately, the sane portion of the planet celebrated our announcement for what it was – validation of what we’d long suspected – that life had to exist elsewhere in the universe. But the number of people who didn’t care, didn’t believe it, or countered it were far beyond our expectations.

In the weeks that followed, fake news died down a little. However, local tabloids, eager to discredit us, kept digging into our personal lives. Most of us had a very minor social media presence and were really rather boring folks with no interesting past to speak of. Dr. Nara, on the other hand, was singled out as a rather vocal and politically active individual. And so, stories insinuating that the whole announcement was simply a left-wing, antifa-centered woke agenda were bounced around the idiotsphere and amplified ad infinitum.

Dr. Nara’s response to their allegations in interviews was sometimes hilarious. “So, you’re saying you’re opposed to antifa? That makes you anti-antifa. You know the fa means fascist, right? So, to be clear, you’re stating that you’re anti-anti-fascist? In other words, you’re pro-fascist. Thanks for clearing that up for the viewers at home.”

Despite the predictably negative right-wing coverage of our announcement, all the relevant and reasonable people in media took immediate interest in our story and heralded our discovery in the manner it deserved. Keiko Murata, Dr. Kallas, Dr. Nara, Professor McTavish, and I were all interviewed on camera many times, invited to podcasts, TV, and radio studios, and interviewed and profiled in many prominent magazines and newspapers. For a month or two after our announcement, media appearances and the like took up so much of our time that we got very little real research done.

And as our story was further covered, right-wing opposition to our achievements intensified. Within a few days of our announcement, the local police posted a few guards around our lab. And a week or so later, that number of guards was quadrupled, covering a far larger area of our campus. A few months later we'd be showing our ID badges four or five times just to get to our lab. The far-right threat was all too real and all too organized to ignore.

Once the buzz around the discovery of Murata-1A had died down, we went back to business as usual. We'd managed to acquire a semi-permanent allocation on an EPOCH2.x device – the one originally used to zoom-in on Murata-1A. And before too long, EPOCH3 devices become widespread enough for us to finally consider replacing our ageing in-house EPOCH2 apparatus with a well-deserved upgrade.

Chapter 6 Abiogenesis

The introduction of QUERY EPOCH3 technology would eventually allow us to revisit previously identified inhabited planets and capture much more detail about their ecosystems. It allowed us to identify forests, coastlines, rivers, lakes, mountain ranges and a variety of unseen features on these planets. EPOCH3 would also allow us to observe herds of larger animals and signs of buildings or settlements, if present. Revisiting inhabited worlds with EPOCH3 technology enabled us to discover many distinct ecosystems driven by local conditions. We found water worlds and 'Atlantis' worlds comprised of large oceans dotted with archipelagos and inhabited by great schools of water-dwelling organisms. We identified 'avian' worlds with deep canyons and mesa, abundant with flying creatures much larger than pterodactyls. We found 'Jurassic' worlds containing reptiles like the dinosaurs that once existed on Earth. Warm planets with high oxygen concentrations were host to swarms of very large insect-like species.

Prior to QUERY EPOCH3 devices, our assumptions about the possibility of life developing on extra-terrestrial worlds were based on processes that had occurred on our planet. As it turned out, our assumptions had been correct. After we'd developed EPOCH3, we were able to verify that the processes that lead to the formation of life on Earth worked in very similar ways on other planets.

One of the most well-respected proponents of abiogenesis – the mechanisms that led to the formation of life on Earth – was Dr. Madson. It was during the latter years of QUERY EPOCH3 that we'd need the assistance of a xenoanthropologist. And it was Dr. Madson who answered our call and helped us classify and study alien life on distant planets.

Dr. Rachel Madson was a Canadian biologist, in her early thirties, from the University of Toronto. She was known among her colleagues to be inquisitive and passionate, always seeking out new information to enrich her understanding. Her mannerisms were pleasant and professional, and her enthusiasm for her work often shone through as she discussed her research. Dr. Madson had a petite frame with a slim build and shoulder-length, light brown hair. She usually dressed in casual attire that included overly large jumpers, comfy trousers, and sneakers.

We were first introduced to her when she visited our facility to present a lecture on the concept of abiogenesis.

“Life formed on our planet through a process of abiogenesis that started around four billion years ago,” Dr. Madson stated. “Abiogenesis is an evolutionary process that gives rise to the

formation of polypeptides, lipids, carbohydrates, amino acids, RNA and certain precursors to the formation of life that include molecular self-replication, self-assembly, autocatalysis, and eventually the formation of cell membranes.”

As physicists, engineers, and computer scientists, we were a little lost by the terms Dr. Madson used during her lecture. Nonetheless, these were concepts we imagined we may need to become familiar with, and so we paid close attention to what she was saying and took notes, as much as we could under the circumstances. Of note was the fact that Dr. Williams had not bothered to even attend the lecture. We took it as a sign of his disinterest in life sciences, which he had made abundantly clear on many occasions.

Dr. Madson continued. “It is now widely agreed that abiogenesis started on this planet shortly after the formation of our oceans, likely near hydrothermal vents on ocean floors. And it is also widely appreciated that any planet of similar composition to our own, capable of forming water oceans, would also readily sustain the process of abiogenesis.”

Of note is the fact that Dr. Madson’s conclusions formed the basis for solving one of the missing parameters in the Drake equation – the formula for estimating the number of potentially inhabited planets in our galaxy. Several elementary constants in the Drake equation had been accounted for since its inception in the 1950s, but the rate of formation of life on habitable planets was one of the last variables to have been solved. We knew that QUERY would eventually allow us to determine more of those variables, but only after more results and improvements to the methodology.

Dr. Madson continued. “The organic materials that serve as precursors for the formation of life have also been extensively found in extra-terrestrial sources such as comets, meteorites, nebulae, and in interstellar and protoplanetary dust particles. Those compounds bombard planetary bodies and are thus thought to accelerate the processes that lead to the formation of life.”

Dr. Madson, from what we knew about her, was a biologist by nature. She had recently pivoted to the study of extraterrestrial life – after QUERY EPOCH3 had been developed – and had since devoted her research to the study of xenobiology and xenoanthropology.

During her visit, Dr. Madson spent a great deal of time conversing with Dr. Nara. Given that Dr. Nara’s team’s study of simulated alien ecology had provided the field with a foundational understanding of potential evolutionary processes and routes to the formation of theoretical alien species, the both of them had a lot to discuss. QUERY EPOCH3 didn’t provide xenobiologists with detailed information about extra-terrestrial life, but they had been given a glimpse into the first indications that such life existed, and that biodiversity on alien worlds was vast, abundant, and different to our own.

After our acquisition of an EPOCH3 device, Dr. Madson frequently visited to help on projects. It was during her visits that we noticed Dr. Williams acting in a rather odd and secretive manner. He tended to avoid being in our lab when she was around, and I’m sure I wasn’t the only member of our team to spot him having private conversations with her on more than one occasion. None of us gossiped about it, although I could sort of tell that Dr. Kallas really wanted to. From my point of view, they both deserved their privacy.

After several visits, I recall having lunch with Dr. Kallas, and Dr. Nara. The conversation had drifted over to Dr. Nara's prior experience with artificial intelligence.

"The beginning of the recent boom in artificial intelligence started around 2014. Of course, I was still a child back then. However, I do remember using AI to write my homework when I was a teenager," Dr. Nara said.

"I remember when those first arrived, too. If I recall, one of them was designed specifically for scientific purposes. A demo was released, but it was so heavily abused it was taken offline in less than a week," I replied.

"Did you know that they changed the way we were assigned homework after those AI writers became available?" Dr. Nara stated.

"So I heard," I replied.

"I recall there was some debate back then as to whether those AI writers could be considered intelligent," Dr. Kallas interjected. "The discussion suggested that intelligence might just be a series of domain-specific tricks. Sort of based on the idea that complexity often emerges from the interaction of many simple parts," he added.

"That idea was the basis for much of the research we did in the artificial life area," Dr. Nara replied. "Complex behaviors can emerge from the interaction of many simple agents. For instance, flocking birds, schools of fish, or swarms of ants."

“Right. Yeah. If I remember the theory was based on the idea that we’re simply creatures that have evolved over four billion years. We’re just another sort of animal on another sort of planet. All animals exhibit intelligence. Some behaviors overlap. Thus, intelligence might just be a lot of simple tricks and nonsense,” Dr. Kallas replied. He hoped at least one of us got his Star Wars reference. But we didn’t.

“What was the conclusion of that debate?” Dr. Nara asked.

“The conclusion was that we didn’t understand intelligence. But if the hypothesis held, it might have meant that strong artificial intelligence was easier to achieve than we first thought. On the other hand, it might have meant that artificial intelligence systems are a collection of tricks and are nothing like human intelligence. Basically, a dead end.”

“Although we still don’t have strong artificial intelligence, some of its recent applications are quite impressive. For instance, the weather prediction stuff,” I replied.

“I remember old weather prediction. It was often wrong for the same day. They’d predict rain and it’d be dry and hot and sunny all day,” Dr. Kallas replied.

“Really?” Dr. Nara asked in a surprised voice.

“Yeah, it really wasn’t all that long ago. Now they can predict the exact day a hurricane will form, its strength, the direction it will travel, and where it will finally dissipate. More than six months out,” I replied.

“Don’t you find accurate long-term prediction just a little unsettling?” Dr. Kallas asked.

“In what way?” I asked.

“Well, if something as complex as long-term weather patterns can be predicted, what else might AI systems be able to predict with high accuracy? Social systems? Geopolitics? Economics? People’s behavior?” Dr. Kallas replied.

“Well, it depends upon whether it, or someone, will use those predictions to do something bad,” Dr. Nara replied. “Like, take your personal assistant on your phone or augmented reality glasses. If they’re built on a sufficiently advanced AI, that AI may try to optimize its user. If that sufficiently advanced AI can talk to other systems, such as those predictive systems and the AIs in other peoples’ devices, they may try to optimize everyone.”

“Well, that’s a fun thought,” Dr. Kallas replied.

“But it makes sense. Predictions become more accurate when you have control over some of the variables. If you can remove some of the chaos. An AI tasked with predicting something will do everything it can to improve those predictions. Even if it means exerting control over the system it was asked to predict,” I replied.

“That could get interesting with this shared perception thing we’re all using nowadays,” Dr. Kallas added.

Shared perception was the latest fad in augmented reality. It was a mechanism that allowed multiple people to see the same holographic representation at the same time. We often used shared perception in our lab when collaborating on tasks. It, for instance, allowed multiple people to work on the same QUERY data representations at the same time. We even had special ‘pods’ configured for such work.

“Oh! Robert is going to absolutely love that theory! We should share it with him!” I replied.

“Talking of Robert, what’s up with him?” Dr. Kallas asked.

“I would prefer to refrain from engaging in gossip,” I quickly replied. But Dr. Nara had heard what Dr. Kallas had just said and looked eager to interject.

“What do you mean what’s up with Robert?” she asked.

“Well, he’s been clearly avoiding Dr. Madson. But I’ve seen them talking together on a number of occasions. In private. The last time I saw them, she sort of grabbed his arm and pushed it. It looked like they were having a fight,” Dr. Kallas excitedly replied. We could tell he’d wanted to gossip about Dr. Williams’s sneaking around for weeks and he’d finally found the opportunity to do so.

“You can’t be thinking that there’s something going on between them?” I stated.

“I mean, it does all seem rather odd. In a cloak-and-dagger kinda odd manner,” Dr. Kallas replied.

It was at that point that I noticed the rather large grin on Dr. Nara's face. "Okay, come on. You obviously know something about what's going on," I said. "Put us out of our misery."

"You're like a couple of old washer women," she said. "I almost feel like not telling you. It'll be fun to watch the both of you continue to speculate."

"Oh, come on," I replied, "I tried to stop the speculation. It was you who egged Riks on!"

"So... what do you know?" Dr. Kallas asked excitedly. "Are they seeing each other? Do they have a history? I mean they're both from Canada."

Dr. Nara paused for a moment. And then she told us. "Dr. Madson is Robert's sister."

"What? Really?!?" Dr. Kallas exclaimed.

"I wonder why he never told us?" I added.

"How come they have different last names?" Dr. Kallas asked.

"She used to be married," Dr. Nara replied. "Apparently the divorce is taking longer than she'd hoped and she hasn't gotten around to changing her name back."

"Is it a touchy subject?" Dr. Kallas asked.

“Not really, no,” Dr. Nara replied. “She’ll happily spill all the juicy details over a bottle of white.”

Chapter 7 EPOCH4

When we next saw Dr. Williams, we came straight out with it. “Why didn’t you tell us Dr. Madson was your sister?” Dr. Kallas asked him.

“What? Oh that,” he replied. “Well, I mean, she’s in life sciences. That’s really not something I want to be associated with. And besides, I thought she had already told you herself.”

“Wait. Have you been avoiding your own sister because she’s a biologist?” Dr. Kallas asked.

“Well, no actually. I’ve been avoiding her because she can be a tad annoying,” Dr. Williams replied.

“Annoying,” Dr. Kallas repeated, nodding.

“Patronizing?” Dr. Williams replied.

“Patronizing,” said Dr. Kallas. He turned to me. “Did you find Rachel annoying or patronizing?”

“Nope,” I replied.

“Anyway, I’ve got to be somewhere. See you later.” Dr. Kallas turned and hurried down the corridor.

“This conversation is to be continued!” Dr. Kallas shouted as he hurried off.

“Interesting,” I stated. “There’s something he’s definitely not telling us.”

“We really need to get those two in the same room. I get a feeling that might provide us with an almost infinite source of humor,” Dr. Kallas replied.

“Oh absolutely!” I replied. “Oh, by the way, did you hear? They’ve officially achieved EPOCH4!”

“No way! Really? Is there a paper? If there is, can you send me a link? Have you seen any results yet? Are there any images? What are the exact specifications of the system’s optical resolution?” Dr. Kallas replied with a level of enthusiasm above and beyond normal. If I didn’t know any better, I might have assumed he’d slightly wet himself when I told him the news.

QUERY EPOCH4, by definition, was achieved just two years after the first EPOCH3 prototype. Which was a shame for us, since we’d just spent a hefty amount of budget getting an EPOCH3 device installed in our lab.

QUERY EPOCH4 enabled us, for the first time, to observe organisms on extra-terrestrial worlds in detail. While EPOCH3 had allowed for high-level observations of ecosystems and

aerial views of some of the larger creatures on inhabited worlds, EPOCH4 allowed us to see what those creatures actually looked like. We were also able to observe smaller creatures and plant detail, and to explore regions not accessible before such as under water, under the canopies of forests and jungles, and in caves.

When EPOCH4 devices became accessible to the research community, a multitude of new teams were tasked with the exploration of known inhabited planets. Exploring and cataloguing an entire planet using QUERY represented a multi-year venture, even for a large team of researchers.

During one informal chat we had not long after gaining access to some of our first EPOCH4 data, Dr. Madson noted “We can finally observe that although species documented on other worlds aren’t identical to any creatures found here on Earth, observed patterns of evolution are consistent with the patterns occurring on our own planet.”

“Is this consistent with prior hypotheses?” I asked.

“Yes, absolutely! This is the result we’ve been waiting for. And it’s been a long wait,” she replied. “It is estimated that over five billion species have existed on Earth. Ninety nine percent of them are already extinct. It is possible that some of the species we’ll observe on other worlds, might resemble species that lived on Earth in the past. The tree of life that starts with anaerobic microbes living near thermal vents in the deep ocean gives rise to a diverse range of plant and animal life. Those same evolutionary paths tend to start with very similar building blocks. And so, what we’re expecting to see is ancient life on other worlds mirroring what happened or is happening here in somewhat predictable and familiar ways.”

“Or course, we can’t see microorganisms with EPOCH4, so our analysis will focus on multicellular organisms observable at current resolutions,” she added.

“You know what excites me the most about EPOCH4?” Dr. Kallas asked. “The ability to finally search for signs of technologically capable alien species.”

EPOCH4 represented a turning point in the general population's interest in QUERY technologies. As Dr. Nara had accurately predicted, the ability to "be anywhere in the universe" prompted many nutjobs to consider the technology as a means towards mass surveillance. Suddenly nothing in the world was a secret anymore. And that fact made a lot of people very paranoid. And as predicted, that hysteria and paranoia was directed towards scientists using the technology for peaceful, scientific research. And the usual types whinged and cried like the spoilt babies that they were.

The elites want to control us all with their new device - it will be the end of freedom in this country and the start of a surveillance state. #NoWay #GlobalistAgenda

My rights don't mean anything if the state can spy on me 24/7. #NeverPrivacyAgain
#BigBrotherWatching #TraitorScientists

We can't even trust our own government. They don't care about our rights or privacy anymore. They should hang the scientists that made this abomination. #NotMyGovernment
#NotMyScience #FightForYourRights

The pedo elite has a new way of spying on our children #NewWorldOrder # PedoElite

They say this new device is for "the greater good", but who's to say that it won't be misused?

It probably already is. #SurveillanceState #PatriotsFight #NoToQUERY

And, well, you get the picture.

At the time of EPOCH4, QUERY devices were still multi-million-dollar pieces of equipment, and every device and its usage history was carefully monitored and regulated. Even though the world's multitude of super-rich oligarchs could have easily purchased hundreds of QUERY devices each, sale of them was strictly prohibited to the public. At least through official channels. And although it was entirely likely that government agencies, militaries, and even law enforcement agencies had them, mass surveillance enabled by QUERY was simply infeasible.

Not long after the announcement of EPOCH4, right wing radicals stepped up their attacks on QUERY scientists. I recall one evening while we were working late, news of an attack at the University of Houston broke. A colleague popped her head into our lab to inform us and we promptly gathered, with others who were still in the office, in a common room across the hall. There, we watched events unfold on a rather ancient sixty-inch OLED television.

“We here at the University of Houston, witnessing the scene of what is suspected might be yet another mass shooting,” the TV reporter stated. Scenes on the television depicted armored vehicles and a large number of militarily attired SWAT police surrounding several buildings. The sound of quadcopters and helicopters whirled overhead. The reporter continued. “An

unknown number of armed assailants entered this building earlier this morning. Shortly thereafter, gunfire was heard.”

“Law enforcement were quick to respond to a call and are now at our location.” The scenes on the television showed a lot of bustle and police activity. An SUV arrived at the scene. Two SWAT police exited the vehicle and proceeded to open the trunk. A moment later several black frisbee-shaped objects flew out of the vehicle and hovered above the men.

“We now have unconfirmed reports that Spectre drones are about to be dispatched to the suspected location of the shooters,” the reporter continued. A moment later, the black discs ceased their hovering pattern and zoomed across the camera’s viewfinder, disappearing into the building. Shortly thereafter, a series of flashes emanated from the building’s windows.

Spectre drones were AI-powered fully autonomous quadcopter-style drones, equipped with weaponry, infrared sensors, motion sensors, lidar, radar, and, well, you name it. They were initially developed for use by the US military but had been passed down to law enforcement agencies when the new and superior Cyclone model was developed. Despite being hand-me-downs, they were still formidable weapons. Spectres were able to navigate tight indoor spaces at frighteningly high speeds. It was even demonstrated that automated weaponry couldn’t shoot one down.

Earlier versions of the drone had been somewhat error-prone and were associated with accidental killings. This association largely stemmed from an infamous incident in the Middle East where several protestors had been shot. After being repurposed for law enforcement in the US urban theatre, their AI had been fully retrained for domestic scenarios

including armed robbery, mass shootings, and hostage situations. Spectre onboard AI was thoroughly field-tested and had the uncanny ability to delineate between hostiles and bystanders with a more than 99.999% accuracy. Despite their exceptional track record and proven reliability, the use of Spectre drones was still a hotly debated topic in the US.

We watched the coverage for another thirty minutes or so, during which several SWAT teams entered the building. The reporter speculated on the situation for some time and then finally confirmed that everything was back under control. Just as we were about to leave the common room, she reported that the six armed assailants, known members of Guardians of Liberty, a militia group associated with far-right terrorism, had been successfully neutralized. We didn't know what 'neutralized' meant in this context, but we all knew what we hoped it meant.

The following day we would learn that three scientists were killed and another eight were injured by the militia. Of those killed was Professor Jim Martin, who had been leading research into a study of solar systems in galaxies discovered by the original Hubble Deep Field experiments. Dr. Kallas and I had collaborated with him during the early days of QUERY, making his loss all that much more tragic to us personally.

Although many similar planned attacks were foiled during the next six months, another shooting on the UCLA campus that claimed more lives wasn't.

Chapter 8 Space lobsters

A short while after EPOCH4 was taken into use, Dr. Madson brought us some exciting news.

“Guys, I have to tell you about this. There’s been no announcement, and the research is still confidential, but a friend of mine in Toronto passed this preprint over to me for review. It’s really exciting!” she exclaimed.

“Do tell!” I replied.

“This paper details what is thought to be the first discovered technologically capable species found outside of our own planet,” she said.

“Ahh! Exciting! We finally get to use QUERY to progress our own scientific endeavors!” Dr. Kallas replied.

“Well. Umm. Maybe not in this case,” Dr. Madson replied. “Perhaps I should tell you a bit more first.”

“Okay, the floor is yours,” I replied.

“Right, so according to the preprint, the species was found on a planet designated as Hass-2L,” Dr. Madson stated.

“I think I remember that one,” Dr. Kallas replied. “Orbiting a K-class giant in the Centaurus A galaxy. A warm jungle-ridden planet with a large Pangaea-like landmass.”

“How do you remember all of those classifications?” I asked.

“I have trouble sleeping, and so I browse the SCOPE database. I guess those facts just stick in my brain,” he replied.

“By the way, you’re correct on those facts,” Dr. Madson replied. “According to the paper, the team focused on planets orbiting K-class giants due to a theory that the habitability of planets orbiting such stars should be higher than that of planets orbiting other star types. The radius of the star that Hass-2L orbits is sixty eight times that of our own star.”

“Our own star is a G-type star,” I added. “A little rarer.”

“Correct. In fact, the paper states that K-class stars make up twelve percent of all stars in our neighborhood. Anyways, the publication also contains other trivia, such as the fact that Hass-2L is slightly smaller than Earth, has a year that last one hundred and ninety-seven Earth days, and has a day equivalent to about one point three Earth days. It also has two small moons,” Dr. Madson added.

“If I recall, the planet has no polar ice caps and has carbon dioxide concentrations at aa much as three thousand parts per million. Hence the jungles and thick vegetation,” Dr. Kallas interjected.

“Yep, that checks out,” Dr. Madson replied. “Anyways, onto the species themselves. Apparently, they’re a shallow water-dwelling crustacean-like species with an exoskeletal structure. They live in tightly grouped communities made up of constructed pod-like dwellings in the shallow waters of the many inlets and bays, on the west coast of the planet’s main landmass.”

“Space lobsters?” Dr. Kallas joked.

“Well, yeah. But basically stone-age space lobsters,” Dr. Madson replied. “According to the paper they construct tools, buildings, and religious artifacts at a roughly stone age-level of technology. They cultivate sea-based plants around their settlements and conduct basic trade between communities. Some tribes have apparently adopted religious symbology and rituals.”

“Religious space lobsters,” I added. “Does it say anything more about their appearance, size, that sort of thing?”

“Yes, it does!” Dr. Madson replied. “Here it states that physically they resemble elongated lobster-like creatures, with four pairs of legs. Their front-most legs are longer and contain hand-like spiny appendages that they use to grasp and manipulate objects. They can stand somewhat upright, but locomote mostly using all four pairs of legs. The largest of their species grow up to roughly one meter in length.”

“Very big space lobsters,” Dr. Kallas replied.

“Compared to lobsters on Earth, yeah,” Dr. Madson replied. “Oh interesting. Here the paper states that they have a very long lifespan with some living for many hundreds of years.”

“Don’t our own crustaceans have long lifespans?” Dr. Kallas replied.

“I’m not completely sure, but I believe it was determined that they don’t age like we do. They eventually get so big that they run out of energy trying to regrow new shells. Otherwise, they’d essentially be immortal,” I replied.

“So, wait. If these guys continue to advance like we did, they’ll eventually figure out a medical solution to the problem of shell regrowth. If that happens, they’ll be able to extend their lives to possibly thousands of years...” Dr. Kallas posited.

“Or more,” I replied. “And if they keep growing, they’ll end up being massive!”

“Oh no! Giant intelligent space lobsters!” Dr. Kallas replied.

Dr. Madson was unamused with our joking around and butted in with more quotes from the preprint. “The species reproduce infrequently by laying eggs in the shallow waters outside of their main encampments. Most are blue-black in color, although the religious elders of some communities paint themselves red for ceremonial purposes,” Dr. Madson replied.

“This is interesting stuff,” Dr. Kallas replied.

“Yeah! When I first saw the paper, I was expecting to read about a discovery of an alien race similar to us, and with roughly similar technological progress. But this is different in a refreshing way,” Dr. Madson replied.

“Does the paper talk about their diet?” I asked.

“It does!” Dr. Madson replied. “Here it states that Hass-2L has many land-dwelling species that form a complex food chain. However, none of the land-dwelling species are a threat to the crustaceans. They’re apparently herbivores, and thus are left to compete only with other organisms that feed on sea plants in the shallow waters close to their habitats. This fact accounts for their very peaceful nature and preponderance for communal activities. The paper goes on to state that their drive for competition appears to be low compared that of our own species' early development. It notes that their relatively early adoption of cultural traits such as dances, get-togethers between separate villages, and religious rituals are indicative of the formation of what looks to be a very peaceful and prosperous race.”

“That last part is inspirational,” I stated.

“Yeah, it is,” Dr. Kallas replied. “I feel really bad for calling them space lobsters.”

“Don’t worry, Riks. By the time we have the technology to go and meet them, they’ll probably be able to laugh at that designation!” Rachel replied.

“True! And I’d be happy for them to call us space apes in return!” Dr. Kallas laughed.

“Oh, by the way, the paper presents a new nomenclature for the designation of technologically capable extraterrestrial species. It designates the crustacean species described as TES-1. The acronym stands for Technological Extraterrestrial Species. The number is to be incremented with each new discovery,” Dr. Madson added.

“TES. Makes sense,” I replied.

The discovery of TES-1 made us all think about species on our planet and their capability for intelligence, or eventual evolution of intelligence. We'd known that certain species on Earth had the capacity for intelligence even before the invention of QUERY. To observe a race such as TES-1 that resembled our own crustaceans made us think about our own planet and how we were treating it.

During the first year of EPOCH4, over one thousand additional technologically capable alien species at various levels of advancement were discovered and documented in a "Technological Extra-terrestrial Species" repository.

During that year, Dr. Madson joined our team full-time and relocated to London. Dr. Williams could no longer avoid being in a room with both her and us after that. And it was during that time that we finally witnessed their brother-sister relationship. Dr. Madson, having grown up dealing with Dr. Williams's quirks, had a solid process for dealing with him. She was clearly the dominant party in their relationship and every time Dr. Williams played up or said something rude, she'd immediately tell him off. This often included raising her voice and slapping him around the head in a playful manner. The dynamic was hilarious to observe. Dr. Madson's presence reigned in Dr. Williams's arrogance and self-righteousness. He became a humbler and more constructive member of our team.

After a year of studying numerous extra-terrestrial species, we observed interesting and surprising patterns in evolutionary dynamics. Dr. Madson shared her insights on one occasion.

“When considering the evolutionary heritage of technologically capable alien species, we can often draw parallels to species here in Earth. Although a planet's environmental conditions play a vital role in evolutionary processes, the paths that evolution takes appear to be remarkably similar across habitable worlds we've studied. Contrary to most popular science fiction, we're not seeing humans everywhere. In fact, we haven't found a single alien species that even remotely resembles our own.”

“Most popular science fiction skimps on spending and just dresses humans up as aliens,” Dr. Kallas interjected.

“Yeah, if they were to make a TV show about what we've observed, they'd need a lot of expensive computer graphics!” I replied.

“Or they could simply take footage from the TES archive,” Dr. Williams added.

“All good points,” Dr. Madson added. “So why haven't we seen any other humans? On Earth, it was primates that first evolved technological capabilities. However, other species on our planet are known to use tools, build structures, and alter the environment. Beavers fell trees across rivers, which create dams that catch objects and food, but also affect the flow of rivers themselves. Spiders build webs that trap other insects. Birds drop stones in bottles to raise the water level, allowing them to drink. The list goes on, and the point is, many of these species, if given enough time, could and would continue to evolve more intelligence,” she added.

“Let us not forget that some species on our planet are potentially intelligent enough to become technological but simply haven’t,” I replied. “I once heard someone say that dolphins have been around for twenty million years, and they’ve never built a radio telescope.”

“True. That would go for a lot of other water-borne species,” Dr. Madson added. “And although we've seen technologically capable primate-like races on other worlds, we've also seen technological species that have evolved from creatures similar to our own insects, reptiles, amphibians, birds, and a large range of non-primate mammals. Still, most of the species we’ve observed bear no resemblance to anything on Earth’s tree of life.”

“I found that one insect species particularly interesting,” Dr. Kallas replied.

“Oh. Yeah! Those swarm collective intelligence insects. What was the designation?” Dr. Williams replied.

“Umm. I’m looking it up now. TES-149,” I replied. “Their civilization is comprised of queens that are capable of spawning short-lived worker drones each suited to perform different tasks.”

“Similar to ants or bees,” Dr. Kallas added.

“Yeah! Apparently, they communicate almost entirely via pheromone excretions. Colonies are usually controlled by multiple queens,” I added.

“I remember spending quite some time studying the fascinating structures and tools they created. Wasn’t it hypothesized that interactions between certain types of worker drones functioned as a biological computer?” Dr. Williams asked.

“I believe so,” I added.

“After watching footage of that species, I concluded that they require more minerals,” Dr. Kallas added. None of us laughed at his joke.

“In terms of intelligent mammalian species that we've recorded, including other intelligent primate-like species, fur is a predominant trait. The baldness of humans is, in fact, rare, and strange in comparison to everything out there,” Dr. Madson stated.

“So, you’re saying that most aliens would find our appearance strange?” Dr. Kallas asked.

“More like repulsive,” Dr. Madson answered.

“If you put a bunch of those alien species we’ve observed into a bar, it would look like Mos Eisley space port,” Dr. Kallas joked. We laughed at that one.

“That aside, let us not forget that just over one hundred years before the invention of QUERY, many in the world, including prominent scientists, believed in the existence of Martians. Our knowledge of even our own solar system was so limited that the idea of little green men living on the nearest planet to ours was entirely plausible. It is amazing to think about how much we've learned in such a short amount of time,” Dr Williams added.

We add nodded in agreement.

“You know what’s odd?” Dr. Kallas added. “After a year’s worth of study and over a thousand technologically capable species documented, we still haven’t found a single one more advanced than our own.”

“Yes. That is rather odd,” I replied.

“I’d use the word concerning,” Dr. Williams added. “Logically, it points to the idea that there’s a way to block QUERY scans that we don’t know about. The more advanced races are hiding from us.”

“That hypothesis is indeed concerning,” Dr. Kallas replied. “If they can block a scan, they could hide entire planets, solar systems, or even galaxies.”

“Surely gravitational effects would allow us to detect the presence of something hidden, even if we can’t see it in a QUERY scan?” I asked.

“True. But those interactions are highly complex. We still don’t fully understand the physics behind galactic procession. And when things seem out of place, we tend to attribute it to dark matter,” Dr. Williams replied.

“So, what we’ve attributed to dark matter might be galaxies that are hidden by some super advanced tech?” Dr. Madson asked.

“That hypothesis is worth considering,” Dr. Williams replied

Chapter 9 Toilet TV

Many recordings of extra-terrestrial species were captured during the course of research into their home worlds and cultures. And those recordings were carefully vetted before being uploaded to the TES repository for ethical reasons. This policy was largely put in place because, shortly after the launch of the TES repository, the Internet became host to an increasing number of alien porn enthusiast groups. Such groups posted synthesized and deepfaked videos on that topic on various forums and channels, which was, frankly, disturbing.

The development of EPOCH4 and subsequent discovery and study of many other technologically capable extraterrestrial species precipitated some interesting discussions in our lab. I recall one rather vividly.

“If we’re watching and documenting intelligent extraterrestrials on other worlds, and in other galaxies, it only seems logical that others have done the same to us,” Dr. Kallas posited.

“Or they’re doing that right now,” I replied.

At that moment, Dr. Williams walked into the lab. “What are we talking about?” he asked.

“We’re discussing the idea that if we’re watching less advanced aliens with QUERY, might it be possible that more advanced aliens have watched us in the past,” I replied.

“Or are watching us now,” Dr. Kallas added.

“Oh, you mean like an alien big brother?” Dr Williams asked.

“Yeah. Good analogy,” I replied.

“Don’t we already have that TV show?” Dr. Williams asked.

“Well, yeah, of course. And don’t remind me. How many decades has that tripe been running?” I replied.

“Yeah, but that’s a controlled environment where people sign up knowing they’re going to be filmed. If aliens are ‘big brothering’ us, we don’t know about it at all. And with billions of people on the planet, who are they choosing to watch?” Dr. Kallas added.

“Well, if they’re sufficiently advanced, we can only assume that every household has one or more QUERY devices, and they can basically tune into wherever they want. Perhaps even multiple locations,” Dr. Williams replied. “Anyway, what would make us interesting. I’m sure there are millions of inhabited worlds out there with more debauched goings on than our own boring planet.”

“Ahh, but that’s the point. Maybe what we do here is more debauched to an alien species than how we rate it,” Dr. Kallas replied. “For instance, a simple thing like brushing our teeth might be considered erotic, humorous, or disgusting to an alien species.”

“Well, I’m not going to lose any sleep that the thought of being spied on while brushing my teeth,” Dr. Williams replied.

“It was just an example,” Dr. Kallas replied in a slightly agitated manner.

“How would you feel if an alien tuned in every time you went to the loo?” I asked.

“Okay, point taken,” replied Dr. Williams. “But anyway, isn’t that one of the alien TV channels that Riks watches constantly?”

“It’s a TV show about toilet design and functionality,” Dr. Kallas objected. “Not a show about shitting.”

“Yeah, but the show also features plenty of defecation and flatulence, if I recall,” Dr. Williams replied.

It was true. Over the course of a year or so, the TES designation had expanded from one to over one thousand three hundred. Roughly thirty of those had the equivalent of television. And some of the broadcasts were really quite bizarre. Of special interest were always cooking shows depicting ingredients and cuisines we couldn't possibly imagine, nature documentaries detailing the diverse species of their worlds, and of course news broadcasts. Although we had audio, many of the languages were not yet translated. But even without an understanding of the spoken portion of the broadcasts, they were still, by and large, worth watching. Most were way more interesting than the drivel that aired on human television channels. One alien

television show had captured the interest of Dr. Kallas. And it was, indeed, about toilet design, aesthetics, and, importantly, testing.

“Alright, I admit it. Toilet TV makes me laugh, even if I don’t understand a word they’re saying,” Dr. Kallas replied.

“You don’t have to understand what they’re saying,” I replied.

“True,” Dr. Kallas replied.

Yes, I also found that TV show both humorous and fascinating. It was nothing like anything I’d seen on human TV. It is of note, at the time of writing this book, and many years after the accounted events, that numerous television shows of our own are now dedicated to the dissemination and analysis of alien TV broadcasts. Many of them are very much worth watching. The cultural variety and complexity that can be learned from alien television broadcasts is a topic that could fill not just one, but many books.

Chapter 10 Hidden in the dark

Compared to all the amazing discoveries we’d made with QUERY during its first decade, nothing would prepare us for the next one. And it was Dr. Kallas who first brought us news of it. He rushed into our lab one morning all excited.

“Guys, I need your attention,” he yelled.

We all stopped what we were doing and met him at the entrance to our lab.

“What is it Riks?” I asked.

“He’s probably going to tell us about some new sci-fi show that just started airing,” Dr. Williams remarked.

“No, this is bigger!” Dr. Kallas stated. “It looks like QUERY research just hit the jackpot!”

“More TV shows about toilets?” Dr. Williams asked.

“Hey, give Riks a break,” Dr. Nara replied. “Let him speak.”

“I just received a communication from a colleague at the University of Bath,” Dr. Kallas said, excitedly. “They found something by accident while doing scans outside of our observable universe.”

“Wait. What? They were doing fishing exploration?” Dr. Williams replied. “Isn’t that frowned upon nowadays?”

“Fishing?” Dr. Nara asked. “I haven’t heard that term before.”

“It’s a term we now use for QUERY exploration outside of our observable universe,” Dr. Williams replied. “It used to be considered relevant. Until it was demonstrated that a vast majority of scans of those regions turned up nothing but intergalactic void. It’s now deemed a waste of QUERY resources since there’s enough to be learned from the observable universe,

and we have plenty of accurate predictions on the positions of galaxies and stars within them to direct proper research. It's nothing but a showy practice, and a gamble that can lead to easy chances at publications and conference spots."

"How does it work?" Dr. Madson asked.

"Researchers generally automate it," Dr. Kallas replied. "They run wide-net low-resolution scans on coordinates outside of our observable universe in search of galaxies or other astral phenomena. If they're lucky enough to find anything – and it does require luck – the void between galaxies tends to be huge – higher resolution QUERY scans are then used to capture data that would never have been technically seen."

"Photons from those objects will never reach us," Dr. Kallas added.

"Okay, tell us more," Dr. Madson stated.

"Sure!" Dr. Kallas replied. "Professor Lam's team started some automation to search for a galaxy outside of the observable universe before the bank holiday weekend. The automation was configured to stop searching and start zooming in on a galaxy, if detected, in order to capture pre-selected areas based on various heuristic criteria."

"Yep, standard procedure," Dr. Williams interjected.

"But their automation code had a bug in it," Dr. Kallas continued. "It found a galaxy but ended up zooming into some nearby intergalactic void nearby."

“And they didn’t stop it, fix the bug, and then re-run the scan?” Dr. Williams asked.

“That’s the thing,” Dr. Kallas replied. “It was a long weekend. They started it on the Friday, and nobody was around to notice the error. So, it ran for three days without being stopped.”

Dr. Williams laughed. “Wow, think of all those wasted resources!”

“But it turned out to be a good thing,” Dr. Kallas stated.

“How would detailed scans of intergalactic void ever turn out to be a good thing?” Dr. Williams asked.

“Because they found something,” Dr. Kallas replied.

“What? A stray asteroid or planet?” Dr. Williams asked.

“No, Robert,” Dr. Kallas replied. “They found a star ship. A massive, technologically advanced warship. Hundreds of thousands of light years from anything.”

“Wait? What? No. You’re joking, right?” Dr. Williams replied.

“No, Robert,” Dr. Kallas replied. “I’m serious. I just received the scan data and reports from Professor Lam’s team. It’s legit.”

“Okay, we need to see this,” Dr. Williams replied. “Like, now.”

Dr. Kallas logged into his console and brought up the data. We all looked at it. Dr. Kallas panned around the vessel, zoomed into it. We even looked inside. To describe the ship as technological marvel is an understatement. The feats of engineering required to build such a vessel, and the technologies within were all so completely beyond our scope of scientific understanding that we were left more than a little lost.

“And this isn’t some fabricated data meant to fool us?” Dr. Williams asked.

“Not that I’m aware of,” Dr. Kallas replied. “Here, read this statement from Professor Lam. He sent it out to a dozen teams under NDA. If this is a joke, he’s putting his career in jeopardy.”

We read the statement:

The ship, which is roughly cigar-shaped, with an octagonal cross section, measures approximately 100 km in length, and has a cross-sectional radius of approximately 12 km. Its hull and inner bulkheads are composed of metallic alloys. At this QUERY resolution, we can’t ascertain their composition.

At what we think might be the rear of the ship are four long needle-like structures mounted at each of the octagon's angled edges, and in parallel with the ship's main body. Towards the front of the vessel, sections protrude from the underside of the hull, starting about a fifth of the way from the front and ending about a halfway back. We have not yet determined the

nature of these protruded sections but suggest that their function could range from weapons arrays, to energy or matter collection devices, to hangar bays. Various sized dome-shaped transparent protrusions, some more than a kilometer in diameter, pepper the outer hull. We assume these are observation areas.

As you might imagine, there's a great deal of space to explore inside the vessel. We've so far only seen a fraction of a fraction of a fraction of a percent of what's there. From the areas we have explored, space inside the ship is divided into many different sections that we've identified might be living areas, recreational areas, engineering, laboratories, medical bays, sanitation, food production, and more. We've yet to find any areas that we can classify as a bridge or command station. We have also found storage areas containing what might be munitions or scientific equipment. Again, this is all pure conjecture.

Central to the ship is what we surmise are power systems, shield generators, propulsion, or something of that ilk. Honestly, everything we've observed is far beyond our comprehension. There are data consoles everywhere, but it may take years to find a central computer core, if there is one. We estimate, after very brief evaluation, that the ship is capable of housing tens of millions of inhabitants. However, the vessel, while apparently still powered and operational, is drifting in the middle of an intergalactic void. We have yet to locate crew or signs of any inhabitants.

If this ship was abandoned, we have no idea why. We also do not know for how long the ship has been drifting in space where we found it. I imagine that this exceptional discovery will require years of research to fully understand.

“He’s not joking, is he?” Dr. Nara stated.

“I don’t think so,” Dr. Madson replied.

“Me neither,” I added.

“This report is highly confidential,” Dr. Kallas stated. “Our team was one of the few who received information about the discovery.”

“If this is real, it changes everything,” Dr. Williams stated.

“I agree,” I replied. “This is massive.”

“I suppose we’ll be signing more NDAs?” Dr. Nara asked.

“Yeah, I suppose we will...” I replied.

“So, what are they calling this ship?” Dr. Madson asked.

“Interesting question,” Dr. Kallas replied. “It was given the name HERMES-NEX. The name is based upon a large inscription found on the ship's hull. Of course, the writing on the ship isn’t in English, but the shapes of glyphs can be transposed into similar looking characters from the roman alphabet.”

“HERMES-NEX?” Dr. Nara replied. “What a mouthful. Sounds like an acronym a machine learning paper might conjure up.”

“I think it’s nice,” Dr. Kallas replied. “It sounds suitably alien-warship-like.”

“I’ll give you that,” Dr. Madson replied.

“I’ll send a link to the data to you all,” Dr. Kallas stated. “Have a good look at it.”

We all returned to our consoles and scrutinized the data. It was quite overwhelming. If someone had fabricated this QUERY scan, they’d have had to go to great lengths. Almost inhuman lengths, to be honest. And after a bit, I asked everyone for their opinions.

“So, first impressions?” I asked.

“I’m sorry. I’m still at a bit of a loss for words!” Dr Kallas exclaimed.

“Robert, does this disprove your theory about QUERY jamming?” Dr. Nara asked.

“I’m not sure it disproves the theory. The fact is this ship clearly isn’t cloaked from our scans. There are several possible reasons as to why it isn’t cloaked...” Dr. Williams replied.

“The report states that the ship is still powered. However, the onboard QUERY jammer might be malfunctioning. It could also be the case that QUERY jamming apparatus, if it exists, is large or has massive power requirements, making it unsuitable for use on a ship, no matter the size. For instance, such apparatus may require a star or black hole for power. Since this

ship was found in intergalactic void, it could be that it is simply outside of the range of feasibly deployed QUERY jamming fields. Those would more likely be deployed near star systems, inside galaxies. The race that built the ship may live in a galaxy adjacent to the void where it was found. However, the rest of their civilization and technology may be cloaked. Honestly, the possibilities for speculation on this matter are endless.”

“I know we can’t tell for sure, but it does look like this ship is heavily armed. I mean, those have got to be weapons, right?” Dr. Nara stated.

“If they are weapons, they’re probably capable of destruction on a level we can’t even imagine,” Dr. Kallas replied.

“I suppose it’s comforting to know that this ship is very far away. Outside of our observable universe,” Dr. Madson added.

“Yeah, but whoever built it is thousands of years more advanced than us,” Dr. Kallas stated.

“The fact that we can see this ship means that they’ve had the capability to see us for a very long time.”

“The universe is vast. Perhaps they haven’t looked at every star. Perhaps they haven’t seen us yet,” Dr. Nara posited.

“If they’re thousands of years more advanced than us, they’ll have automated QUERY to the point where they’ll have scanned everything, surely?” Dr. Madson added.

“That’s a valid hypothesis,” Dr. Williams replied. “We can assume they know about us. And we can also assume that they could have wiped us out. And yet they haven’t. In my opinion, this builds credence to the zoo hypothesis.”

“They consider us insignificant, and they’re simply leaving us alone?” Dr. Nara asked.

“Yeah, that would be my guess,” Dr. Williams replied.

“But if they’re watching us, they’ll know that we’ve discovered their ship,” Dr. Madson added. “Might that potentially put us in danger?”

“That’s a distinct possibility,” Dr. Williams replied. “This discovery happened, what, a few days ago?”

“Yep. On Tuesday,” I replied.

“Does that give them enough time to fly here and destroy us?” Dr. Madson asked.

“That would depend on their propulsion technologies. And that’s where we’re going to enter the realm of science fiction,” Dr. Williams replied.

“If this ship or the civilization that built it do go around destroying anyone who develops the technology to find it, this accounts for why we haven’t found any civilizations more advanced than our own,” Dr. Kallas added.

“Good point,” Dr. Williams replied. “These aliens may exert preemptive supremacy over any civilization that might develop to the point of eventually challenging them. If that is the case, I suppose we can expect an invasion. And they’d have plenty of time to get here. It’s not like we’re in a position to reverse engineer anything on board. We’d need EPOCH7 or better to even start doing that.”

“Of course, there’s another theory we haven’t considered,” Dr. Nara added. “Lam’s team didn’t find any lifeforms inside the ship. It could be a long-lost remnant of a now dead civilization. One that was destroyed by a superior adversary. That ship represents the last artifact of their civilization, and it could have been floating there for eons.”

“That theory is very concerning,” Dr. Madson replied. “Imagine the capabilities of a race that defeated the builders of that ship!”

“While Dr. Nara’s hypothesis accounts for the lack of crew,” Dr. Williams replied, “it doesn’t account for the fact that the ship is still powered, there’s no visible damage to the hull, and we don’t see any debris or signs of a battle nearby.”

“I’m sure there are ways of wiping out a ship’s crew without doing damage to the ship itself,” Dr. Nara replied. “They could have poisoned their food or released a biological agent into the atmosphere.”

“Or beamed them out,” Dr. Kallas added.

“Beamed them out?” Dr. Williams replied sarcastically. “How often do we have to put up with that Star Trek crap? Beaming people up is pure science fiction. The very idea of that technology is ridiculous. It will never exist, no matter how advanced we get.”

Dr. Madson slapped Dr. Williams about his head. “Be civil!” she yelled. Dr. Williams looked down at the table. Dr. Kallas cracked a quick grin and then quickly adjusted his facial expression to that of contemplation.

“What if the ship builders were the bad guys and a benevolent race wiped them out?” Dr. Nara conjectured.

“Okay, let’s consider that hypothesis,” Dr. Williams replied. “A benevolent, highly advanced race wiped those guys out. They can obviously see us, and they now know we’ve found that ship. They know that we’ll inevitably develop EPOCH7 and above. We’ll use QUERY to study and reverse engineer the technologies on that ship. As science fiction scenarios go, they’ll want to step in and prevent us from doing so. They’ll worry that we’ll gain access to technologies beyond our understanding and wipe ourselves out.”

“Or go on to wipe others out,” Dr. Kallas interjected.

“Yes. That has generally been our tendency as a species,” Dr. Williams added.

“So, the benevolent race will either wipe us out preemptively. Or they’ll make contact and invite us into a glorious Federation of Planets,” Dr. Kallas replied.

“Star Trek references aside, those do both seem to be logical conclusions,” I replied.

“So, what you’re saying is we’re not totally screwed?” Dr. Madson asked.

“Not quite?” I replied.

Shortly after our team had received news about the HERMES-NEX discovery, debates over whether and how the findings might be presented to the world began. Of all the amazing discoveries that QUERY had led us to, nothing had really presented this kind of dilemma. Of course, there had been fears about how people would react when we revealed the first extra-terrestrial life, the first technological extra-terrestrial civilization, and QUERY EPOCH4. But nothing we had previously encountered had the potential to cause panic and upheaval like this had. And judging by the far-right’s reactions to previous discoveries, a much more severe backlash was to be expected.

In the end, we deferred to the government and let them make the decision. Which took a long time. And during that time, we continued to explore HERMES-NEX.

When the government finally got back to us, it was with the decision that the discovery be kept firmly out of the public domain for the time being, pending "further investigation and deliberation". For once, we agreed with their decision.

Chapter 11 On xenolinguistics

“Did you know that the internal volume of HERMES-NEX is fourteen trillion cubic meters?”

Dr. Williams stated.

“What does that even mean?” Dr. Nara asked.

“I don’t really have an analogy for it,” Dr. Williams replied.

“Don’t you guys always measure size in stuff like Olympic size swimming pools or football fields?”

“Not us!” Dr. Williams replied. “Ask the gun-toting people to the south of us about that unscientific measurement system. They’d probably measure the internal volume of this ship in cups, gallons, and I dunno, thimbles.”

“Don’t you just love it when sci-fi shows use those measurements?” Dr. Nara replied.

“Don’t get me started on that,” Dr. Williams answered. But, hey, what I’m getting at is that a thorough search of the inside of the ship is going to take... decades, most likely. Even with multiple teams of researchers.”

“And we’ve been assigned to explore it?” Dr. Madson asked.

“Yep. We have.” Dr. Kallas replied in a slightly annoyed and weary tone.

“Are we not looking for nearby galaxies? You know, that might be host to whoever built this thing?” Dr. Nara asked.

“Not us,” Dr. Kallas replied. “Several other teams are already on that.”

“Right,” Dr. Nara replied. “Good to know. We are to focus on the HERMES-NEX.”

“HERMES-NEX is such a mouthful to say,” Dr. Madson remarked. “How about we abbreviate it?”

“What about HEX?” Dr. Nara suggested.

“I like that!” Dr. Kallas replied. We all nodded.

“There’s alien writing everywhere in the ship,” Dr. Kallas stated.

“We have a couple of xenolinguists available to help us,” I said. “Work with them as needed.

“I’ve set coordinates for each of you to search. Let’s share findings in a week,” Dr. Williams stated. “Good luck, have fun.”

And so, we all started to explore the interior of the ship via QUERY scans. To be honest, the task wasn’t as tedious or laborious as we’d imagined. The ship itself was wondrous – full of gadgets and alien technology. It was everything we’d hoped to eventually find using QUERY technology. And we savored every moment. After a week we got together to discuss findings.

“The interior walls and walkways are composed largely of a dark grey metallic alloy,” Dr. Kallas stated. “We obviously can’t say anything more about its composition at this time. We’ll need much higher QUERY resolutions to do that.”

“Rooms vary wildly in size,” Dr. Williams added. “Even the smaller ones are large compared to rooms in Earth structures. Ceilings in even the most confined of spaces, such as crawl ways and access tunnels are easily over three meters in height. Ceilings in regular rooms are, in the smallest of cases, at least six meters in height. Doorways measure a good four meters high and almost two meters wide. The larger open areas of the ship are, in some cases, kilometers in both length and width and hundreds of meters in height.”

“The race that built HEX must be physically larger than us,” Dr. Madson ascertained.

“I concur,” Dr. Williams replied. “The aliens that built this must be three or four meters tall. Perhaps more.”

“Despite the ship’s size, we’ve found very few elevators,” Dr. Kallas stated. “Everything is connected via corridors, stairs, ramps, ladders, and the like.”

“It would take days for a human to walk a fraction of the ship’s length, or to move up or down a fraction of the ship’s height by foot,” Dr. Williams added.

“That already gave me a better idea about the ship’s interior dimensions than the Olympic swimming pool thing,” Dr. Nara stated.

“How is the work with xenolinguistics going?” I asked.

“Not all that well,” Dr. Kallas replied. “Decoding an alien language is a daunting task, made even more difficult in the absence of the species that created it.”

“Yeah, that’s what they told me, too,” Dr. Madson added. “Apparently, it’s much easier to grasp cultural references when one can observe a species interacting with their environment. And this ship is, well, completely uninhabited.”

“How about the consoles?” I asked. “They contain icons and pictographs alongside glyphs.”

“And they’re in continual update,” Dr. Williams added. “We captured video of a few of them and gave it to the xenolinguists. They’ve not made head nor tail of any of it.”

“Sounds frustrating,” I replied. “Is there anything they have managed to translate?”

“The word for toilet,” Dr. Kallas replied.

“And other simple words depicted around the ship such as corridor, level, floor, cabin, section, and console,” Dr. Madson added.

“Oh, and their numbering system,” Dr. Nara added. “Apparently it’s base eighteen.”

“We found this really cool room,” Dr. Kallas stated.

“Full of gadgets,” Dr. Williams added, “All lined up on tables and neatly labelled.”

“But since we have no idea what the gadgets do, the labels are of no use to the xenolinguists,” Dr. Kallas added.

“I found some very large glass tanks containing what looked like algae,” Dr. Madson stated. “We first thought the stuff might be food. Or perhaps a substrate used by food printers. But so far, it’s been a dead end.”

“The xenolinguist I talked to also suggested we find food,” Dr. Nara added. “Apparently, by observing their food’s shape, color, composition, and size, we might try to equate it with Earth-equivalents and thus make appropriate translations.”

“Did you find any?” I asked.

“No,” Dr. Nara replied. “Well, apart from Rachel’s grow lab thingy. We found no food printers, no food storage, no dining areas. We didn’t even find plates or utensils.”

“The xenolinguists have admitted to being almost completely stumped,” Dr. Williams noted. “They told us that deciphering the language on that ship would likely be a multi-year project.”

“Honestly, it might be quicker to create the technologies needed to get to that ship than to understand the stuff onboard using QUERY,” Dr. Kallas stated.

“Did we figure out what the turret-looking things on the outside of the ship are?” I asked.

“No,” Dr. Kallas replied. “We’re going to have to assume they’re weapons for now.”

“Bloody great weapons, too,” Dr. Williams added.

“If the race that built that ship know we’re snooping around in it, do you think they’ll come here and blow us all up?” Dr. Madson asked.

“It is a possibility,” Dr. Kallas replied. “We could be days away from an invasion.”

“Given we may be facing imminent destruction, perhaps we should consider how it might play out,” I replied.

“We’ve all seen films depicting alien invasions of Earth in which a species advanced enough to traverse the distances between stars in massive motherships arrive on our planet only to be defeated by humankind and our primitive tactics and weapons,” Dr. Kallas stated. “I posit that a film depicting an alien invasion as it would actually happen would likely only last a few minutes, and that is why realistic alien invasion movies have never been made.

“For once, I wholeheartedly agree with Riks,” Dr. Williams replied. “I doubt that any of our culture’s previously imagined alien invasion scenarios are like anything we’re going to face.”

“The way I see it,” Dr. Nara added, “there are two categories to consider. The first is that the aliens travel here and wipe us out. The second is that they destroy us remotely. In my opinion, the second option is way more likely.”

“I agree,” Dr. Williams replied.

“Let’s, for the sake of argument, consider the first,” Dr. Nara replied. “Let’s suppose for a moment that destructive, planet-colonizing aliens might want to do a bit of travelling, see the sights, or perhaps even take some selfies or stream on Tiktok while subjugating a lesser species. Assuming their mothership or armada were sent to our planet, the likelihood that they'd actually land or even send craft into our atmosphere seems somewhat far-fetched.”

“Exactly. Why bother?” Dr. Kallas replied.

“Yep. They could employ any number of more efficient methods to wipe out humanity without stepping foot on our soil - such as deploying a specifically engineered toxin or bioweapon into our atmosphere, beaming every human into space, or disassembling our planet from orbit.”

“That last one seems like a win-win given the resources they could harvest,” Dr. Madson replied.

“When considering remote scenarios, an unmanned probe could easily be sent to achieve any of that stuff. Even a simple long-range-planet-killer missile with faster-than-light or hyperjump capabilities would do the job in a fire-and-forget fashion,” Kano added.

“Push a small red button and then get on with more important business, such as lunch,” Dr Williams added with a grin on his face.

“Haha yeah!” Dr Nara replied. “Other remote destruction options could involve the use of nanoprobes, shot in our direction from afar. Once on the planet's surface, the nanoprobes would replicate and then build the necessary technologies and tools to wipe us out.”

“We wouldn’t even see those coming. In fact, that scenario could have already happened, and we’ll find out it a few days from now,” Dr. Kallas added.

“Exactly,” Dr Nara continued. “And when it comes to remotely wiping out humanity, there's the idea that advanced versions of QUERY might be used as weapons. Our current knowledge of the technology sees it as read-mode. But there’s the possibility that advanced QUERY could be used to manipulate regions of spacetime in write-mode. This would allow matter to be reconfigured, at will, from any distance.”

“I read that paper,” Dr. Williams replied. “In my opinion, it is pure conjecture. Nonsense. And if that theory held any water, we should already all be dead. Any species with QUERY write-mode would be able to wipe us out from anywhere in the universe, in the blink of an eye, and without the need for star ships, guns, armor-clad soldiers who are very bad at aiming, toxins, or whathaveyou.”

“But if the QUERY write-mode theory is correct, it validates the idea of transporter technologies,” Dr. Kallas replied.

“Oh, come on!” Dr. Williams replied in an exacerbad tone. “Not this Star Trek crap again!”

Dr Williams raised his finger and was about to continue his monologue when Dr. Madson gave him a stern look. He put his hand down and shut up.

“If I’m understanding this conversation correctly, can I assume that, bottom line, we probably won’t even know we’ve been invaded?” Dr. Madson asked.

“Yep, that’s about the gist of it,” Dr. Nara replied.

Chapter 12 Grey goo

At around this time I recall an interesting discovery was made by a group working on the SCOPE project. We were all in the lab, still studying HEX. And still not really getting anywhere.

“Hey, check this out,” Dr. Williams stated. “Researchers have found a planet with absolutely no craters, canyons, mountains, or relief of any kind. The planet is completely smooth.”

Dr. Kallas got up from his workstation and hurried over to where Dr. Williams was working. They looked at the images together.

“Could this be a planet that has succumbed to the theoretical grey goo catastrophe?” Dr. Kallas posited.

“Grey goo?” Dr. Madson asked. “What’s that?”

“The grey goo catastrophe is a hypothetical end-of-the-world scenario brought about by runaway nanotechnology,” Dr. Williams replied. “The concept centers around the idea of the creation of nanobots that are able to utilize resources from the environment to self-replicate.”

“I remember that theory,” Dr. Nara interjected. “It posits that if a replicator is able to make a copy of itself in one thousand seconds, the resulting two replicators would then build two more in the next thousand seconds, those four would build another four, and so on. After ten hours there would be over sixty eight billion replicators. In less than a day, they would weigh a ton. In less than two days, they would outweigh the Earth. And in another four hours, they would exceed the mass of our entire solar system.”

“Thanks for remembering those details,” Dr. Williams replied. “The grey goo end-of-the-world scenario has been used as a construct for considering low-probability, high-impact outcomes from emerging technologies. It is similar to the ‘paperclip maximiser’ thought experiment, and an example of instrumental convergence.”

Dr. Nara interrupted Dr. Williams again. “Yeah, the concept that sufficiently intelligent agents with unbounded but apparently harmless goals are likely to act in surprisingly harmful ways.”

“Yes,” Dr. Williams replied. “In the paperclip maximiser scenario, a sufficiently powerful artificial intelligence is given the task to maximize the production of paperclips. As part of its

thinking, it decides that humans are an impediment to the goal, since they may terminate its runtime, and so the AI wipes everyone out. It then proceeds to turn the entire planet, solar system, galaxy, and universe into paperclips, removing any obstacles in its way as it goes.”

“I remember playing a game about that,” Dr. Kallas replied.

“Oh yeah! I remember that one too! It had me hooked for, like, eight hours straight!” Dr. Madson added.

“This actually represents a significant discovery. HERMES-NEX notwithstanding, we’ve finally found a technological civilization more advanced than our own,” Dr. Kallas stated.

“Albeit an extinct one,” Dr. Williams replied.

“I find it interesting that the grey goo hypothesis has a non-zero probability of coming true,” Dr. Nara stated.

“Interesting? More like worrying,” Dr. Madson replied. “I understand we’re seeing somewhat of a renaissance in nanotechnology advancement right now. What’s to say that won’t happen to us?”

“Could this mean that the part of the Fermi paradox that suggests sufficiently advanced civilizations destroy themselves, largely by accident, is more plausible than we’d previously imagined?” I asked.

“It could. Although, to be fair, this is the first dead advanced civilization we’ve found amongst tens or perhaps hundreds of thousands of surveyed planets,” Dr. Williams replied.

“Well, I guess we can’t just sit back and claim that these things won't happen to us anymore,” Dr. Kallas added.

Buried in the notes accompanying the discovery was the fact that brief check of the rest of the solar system revealed no signs that the grey goo had escaped the confines of its origin planet.

The location of the planet was earmarked for further analysis once QUERY EPOCH7 or 8 were available, allowing us to study the nature of the nanoreplicators in more detail.

Chapter 13 The Quest, part 1

During the same busy period that saw the discovery of HEX, the grey goo planet, and a multitude of other exciting results from the SCOPE project, SETI 2.0 made an important finding which they relayed directly to our team. We met to discuss their findings.

“The SETI 2.0 project found something of interest that they’d like us to take a look at,” I said. “According to the data they’ve sent us, they made this discovery while performing planetary surface surveys on habitable planets, previously identified by SCOPE, that exhibited out-of-the-ordinary atmospheric readings possibly indicative of past technological civilizations.”

“Ahh, yes. I heard about that project,” Dr Nara stated.

“Have you kept up with that SETI 2.0 stuff since you worked on the project?” Dr. Kallas asked.

“Somewhat. Not in any detail. And not as much recently since it’s been so busy. From what I remember, they started that project over a year ago,” she replied.

“The finding itself was made on a planet designated Miller-1C, located in the Needle galaxy,” I continued. “During surface-level exploration of the planet they uncovered a set of large, intricately carved stone pillars hidden under the canopy of a sprawling forest on the planet's northernmost landmass. A total of sixty-four pillars were identified, each identical in size – approximately ten meters in height and about one point five meters in both width and depth. A series of glyphs and inscriptions are carved on all four vertical faces of each pillar. The precision of those inscriptions seems to indicate that they were created and placed there by an advanced technological species.”

“Interesting,” replied Dr. Kallas.

“The pillars themselves can’t be dated by QUERY technology. They could have been there for a long time. However, no other remnants of past civilizations were found on the planet. The report doesn’t mention any erosion, but it does state that the pillars are on a geologically stable landmass. Here’s an image of the location,” I added, bringing up an image on a nearby monitor.

The image depicted several oddly shaped and very tall evergreen trees. Their needles had a bluish tint. The pillars could be seen on the ground under the canopy of the forest.

“According to readings, the planet is cooler than Earth, with polar ice present during its entire yearly procession. The ground surrounding the pillars was identified as frozen swampland,” I stated.

“If this planet goes through ice ages, one might expect those pillars to be buried under kilometers of glacier. I doubt they’d survive that,” Dr. Madson stated.

“True. We don’t know if this planet exhibits such climate fluctuations. Which means that either they were put there after the last ice age, or they have been there for millennia,” I answered.

I clicked through a series of images as I read out the next section. “The arrangement of the pillars is as follows. Eight innermost pillars are arranged around the circumference of a circle with a diameter of approximately fifty meters. Each innermost pillar is equidistant from each other i.e., at every forty-five-degree increment about the circumference. Think of them as points on a compass. The rest of the pillars form straight lines fanning outwards from each central pillar such that a line drawn through each set of eight pillars intersects the middle of the main circle.”

The last image depicted a top-down view of the layout of the pillars. It resembled a simple pictographical representation of rays fanning out from a sun.

“The relative location of each pillar, along with all inscriptions have been carefully recorded for analysis,” I stated.

“I wonder if this might be some sort of elaborate puzzle,” Dr. Kallas posited.

“That seems unlikely,” Dr. Williams countered. “Probably just a religious monument.”

“Can you show us those pictures of the sides of one of the pillars again?” Dr. Nara asked. I clicked the images back to the one requested.

“Two of the sides are clearly different from the other two,” Dr. Madson noted.

“Yeah,” Dr. Nara replied. “I’m not professing to be able to read these glyphs, but the patterns on these two sides look like mathematical notation written with a different set of symbols to ours.”

“Now that you mention it, I can see that too!” Dr. Williams exclaimed.

“The other two sides must be written text. Some sort of a guide, perhaps?” Dr. Madson posited.

“Each pillar seems to follow the same pattern. Two sides look like this mathematical notation stuff, and the other two contain more condensed notation,” I replied.

“Perhaps the information on the pillars must be combined in some way to create one long piece of text?” Dr. Kallas posited.

“Yeah, like clockwise, starting from the northern innermost pillar and then in a circular fashion all the way out,” Dr. Madson added.

“Or along each line fanning out, starting with the twelve o’clock position and moving clockwise,” Dr. Nara suggested.

“All the data is in our shared repository, so take a look at it together and let’s see if we can’t work this out,” I told them. “And if we need to bring in some xenolinguists, let me know.”

“The xenolinguists haven’t been all that helpful,” Dr. Williams remarked. “I say we try this on our own first.”

We concluded our meeting, and the rest of the team excitedly headed straight to our shared workspace to play around with their ideas. It only took them two days to decipher the first clue to the puzzle, which they enthusiastically shared as soon as they’d discovered it.

“Okay, we’ve figured part of this out,” Dr. Nara told me excitedly. “We were kinda right about combining the information on the pillars. Determining that pattern took a longer than it should have because we were trying to get both the condensed and mathematical notations to line up into something that looked logical. That was a red herring. The only concatenation we needed to do was on the condensed sides.”

“Still, you lot solved that rather quickly!” I replied.

“Yeah, and it was my pattern that worked,” Dr. Nara added. “Take the third and fourth sides of each pillar fanning out from the northern most one and then moving in a clockwise fashion.”

“We concatenated all of the symbols, from top to bottom, on each face sequentially,” Dr. Kallas added. “This provided us with a long string of glyphs.”

“Yeah, and then we cherry picked examples from the other two faces on a few of the pillars that we recognized. That allowed us to map a few of their symbols to our own mathematical and programming notations,” Dr. Nara added.

“The long concatenation of symbols from the condensed faces appears to be a guide. It contains examples of their numbering system and mathematical operators,” Dr. Williams stated. “Look here.” He pointed to a few symbols that had been highlighted. “This denotes one plus one equals two.”

“And here,” he pointed to another highlighted section on the list of glyphs. “This denotes square root of nine equals three. And so on.”

“They’re using base ten?” I asked.

“It seems so. I was surprised about that too,” Dr. Nara replied. “That’s partially how we solved it so quickly!”

“So yeah, once we’d figured out the numerals, the rest of the operators were pretty easy to decipher. We now know what all the symbols mean,” Dr. Kallas stated.

“I must admit the way it has been presented is most elegant,” Dr. Williams stated.

“I agree,” I replied. “So, what about the other two faces? Have you figured them out yet?”

“Not yet, but we don’t expect it’ll take all that long now,” Dr. Nara replied, hurrying back to the shared workstation.

“Don’t stay here too late,” I shouted. I was pretty sure they wouldn’t pay any attention to that piece of advice.

And they didn’t. When I arrived the next morning, the team was eager to brief me.

“You’ve deciphered the other faces?” I asked.

“Yep!” Dr. Williams replied.

“Okay. Let me get some tea and I’ll be back to hear your explanation,” I replied. I returned with a nice hot cup of tea shortly thereafter.

“So, as we predicted,” Dr. Williams started.

“As I predicted,” Dr. Nara interjected.

“As Dr. Nara predicted,” Dr. Williams continued, “the symbols on the other faces of each pillar did indeed depict mathematical formulae.”

“Well, to be precise, they were a combination of formulae and pseudo code,” Dr. Kallas added.

“Yes, yes. Semantics,” Dr. Williams continued. “Anyway, each pillar contains an algorithm that generates a sequence of numbers. Some of them were familiar to us already. For instance, the Fibonacci sequence, powers of two, Bell numbers, prime numbers, and so forth.”

“Interesting!” I stated.

“Okay, but here’s where it gets good,” Dr. Nara added. “The only way this logically works is if the sequence of numbers on the innermost pillar of each line corresponds with the position of the number in the sequence generated by each pillar behind it.”

“Wait,” I replied. “It’s a bit early in the morning for me. Explain it like I’m five.”

It was clear that both Drs. Nara and Williams had overdone it in the caffeine department.

They were jittery, excited, and spoke way too fast.

“If I might interject,” Dr. Kallas added. “Let’s say the innermost pillar generates a sequence (1, 2, 5, 8, 20, 33, 110), it means you must select the first item of the sequence generated by

the pillar directly behind it, the second item of the sequence generated by the pillar behind that, the fifth item from the sequence described by the pillar behind that, and so on.”

“Okay, I get it now,” I replied. “Go on.”

“The final number is thus derived by concatenating all selected numbers together.” Dr. Kallas added.

“You missed a bit,” Dr. Nara replied. “Each of the innermost pillars contains additional symbols not present anywhere else. A series of vertical and horizontal lines. We noticed that there can be multiple horizontal lines, but only one vertical line that might or might not be present. We inferred that the horizontal lines denote a decimal place, and the vertical line denotes that the final value be multiplied by minus one.”

Dr. Kallas added “So, for instance, if the numbers selected from sequences in the set of pillars are (38, 421, 99, 101, 328, 122, 853) and there are ten horizontal lines and one vertical line present on the inner most pillar belonging to the sequence, the resulting output is - 3841299101.328122853”

“Okay, I get that,” I replied. “So did I understand that the puzzle presents us with eight floating point numbers?”

“Correct!” replied Dr. Williams.

“A set of coordinates, perhaps?” I asked.

“Possibly. That’s something we’ve yet to determine,” Dr. Kallas replied.

“Good work!” I stated. “By the way, did you all stay overnight?”

They nodded.

“It’s Friday. You should leave early and get some rest over the weekend. I’ll book us some time on the departmental QUERY array for next week. I’m getting a feeling we’ll need it.”

“Yeah, you’re probably right about that,” Dr. Nara replied.

While the team were off on some well-deserved rest, I stared at the numbers that the puzzle had generated. I remember thinking that it takes three values to represent a three-dimensional set of coordinates. Eight numbers aren’t neatly divisible by three. If six of those eight numbers represented coordinates, there were still two left over. And the number of possible coordinate sequences that could be derived from eight numbers was still quite large. Also, if the numbers did represent coordinates, a measurement of some kind was needed. Any standard measurement used on our planet would be irrelevant to whoever created the puzzle on that planet. The solution was almost in our grasp. But not quite so.

We all returned from a needed break the following Monday. I thought I’d arrived early that day, but the whole team were already in the lab when I entered. Apparently, Dr. Madson had already come up with a plausible hypothesis for the measurement system.

“Astronomical unit,” she told me.

“But the distance between the Earth and the Sun would have no bearing to whoever designed the puzzle,” I replied.

“No, not our astronomical unit,” Dr. Madson replied. “Theirs.”

“Oh wait. Yeah. I see what you’re saying!” I replied. “You know, I was thinking about this problem all weekend and that though never occurred to me! Well done!”

“Even if we have a measurement system for these coordinates, it still isn’t obvious how to select the three numbers, in the correct sequence,” Dr. Kallas stated.

“Well, we have plenty of time booked on the QUERY array. How about we try to brute force it?” I asked.

“Seems like the only obvious solution currently,” Dr. Williams replied. “I’ll write a program that combines the digits, takes the distance measurement and offset from our own planet into account, and have it run scans.”

About half an hour later, Dr. Williams started his program. And we waited. In the early afternoon we got our first hit. The scan had landed almost perfectly on a star. The next hit was waiting for us when we returned to the lab the following day. We checked to see if the two coordinates had used any overlapping numbers. They hadn’t. So, we stopped the program, figuring we might later determine what the last two numbers meant.

“Interesting. The unused numbers are in the north and south positions. One set of coordinates uses clockwise sequential values from the right-hand side of the circle, so north east, east, and south east and the other comes from the left-hand side, so south west, west, and north west,” Dr. Kallas stated. “I wonder if there’s any significance to that pattern?”

“We have now identified two star systems from the coordinates in the puzzle. Any suggestions on how we might proceed from here?” I asked.

“Draw a triangle between each of the three locations and QUERY scan the center?” Dr. Nara suggested.

“And if not, perhaps QUERY scans of their solar systems? Maybe we’ll find inhabitable planets with clues on them?” Dr. Kallas suggested.

“Okay, let’s try Dr. Nara’s suggestion first. If we find nothing, let’s ask the SETI people to start looking at those two solar systems,” I instructed. “Scouring those planets will take SETI’s expertise and resources.”

We quickly determined that the center point of the triangle that connected all three stars involved in the puzzle was devoid of anything useful. And so, I contacted the SETI folks who’d originally alerted us to the pillar formation and explained what was going on. They were delighted that we’d solved part of the puzzle and promised to immediately scan planets orbiting the two stars we’d located. I provided them with coordinates. And then we waited.

After two days, my SETI contact got back to me with news that habitable planets had indeed been found orbiting both stars, and that they'd initiated full sweeps of the surface of each. I was also told that the surface sweeps might take some time. Possibly a few weeks. And so, we returned to our HEX research while we waited. And after just over two weeks, the SETI folks contacted me with two new datasets. They'd found identically arranged sets of stone pillars on both of the surveyed worlds.

The puzzles on those pillars worked in the same way as the originally discovered set. They even used the same glyphs. So, solving them was trivial. In each case, upon solving the presented problems, another two stars were identified. As we followed the trail, some of the puzzles pointed back to stars we'd already visited, while others pointed to new stars. After a few months of searching for pillars and solving the problems presented on them, we ended up with a total of nine different worlds.

The puzzles themselves had been constructed in a logically redundant manner - find one and you'll eventually find them all. And once we'd determined that the clues had stopped with those nine locations, we attempted to draw lines between vertices of the three-dimensional shape it had created. Unfortunately, lines didn't intersect, and none passed through any other known solar systems or places of interest. We had hit another dead end. The only clues left were the two superfluous numbers obtained from each of the nine puzzles – eighteen numbers in total. They had to be the next clue. But we had no idea what they represented.

“This is frustrating! Those numbers could mean literally anything!” Dr. Williams complained.

“How about we try another brute force search?” Dr. Kallas asked.

“That’s close to five thousand possible three number combinations. You know they won’t go for that. We simply don’t have the budget.” Dr. Williams replied.

“Does anyone else in the team have any ideas at all?” asked Dr. Kallas.

“Not to my knowledge,” Dr. Williams replied. “We spent months collecting this data, solving these puzzles, and doing all these scans. We hit this dead-end weeks ago, and we’re no closer to solving it now as we were then!”

“Do you think the SETI people can run those five thousand combinations for us?” Dr. Kallas asked, desperately fishing for a solution.

“No, I doubt they’d have the capacity either.” Dr. Williams replied.

“Look, it’s getting late. How about we go to the pub for a couple of pints?” I asked.

“You know what? That sounds like a plan. I need to drown my sorrows,” Dr. Williams replied.

And so, we left the lab and headed out. On our way over we bumped into Dr. Nara who asked where we were headed, and then volunteered to join us. “I’m always up for a pint!” she cheerily exclaimed. That wasn’t the first time she’d informed us of that fact. We were happy to have her join us. The more the merrier.

As was common when Dr. Nara was around, the topic of conversation quickly turned to the subject of artificial intelligence. She loved talking about it, and we were always eager to learn more about it.

“So, what do you guys think of when you hear the term artificial intelligence?” she asked once we’d got sat down with our drinks.

Dr. Kallas immediately answered her question with one word. “Skynet.”

“Skynet?” Dr. Nara replied. “What in the hell is that?”

“Terminator. A film from the eighties,” Dr. Williams replied.

“Ahh. Terminator! Yes, I think I’ve heard of that,” she replied. “So, basically, true machine intelligence is what you’re getting at?”

“Yeah,” Dr. Kallas replied. He then clumsily attempted to mimic Arnold Schwarzenegger’s voice. “Come with me if you want to live.” Dr. Nara looked confused. The rest of us felt mild embarrassment.

“What I’m getting at is that what we call artificial intelligence isn’t Skynet or the Terminator. It’s a misnomer. What we refer to as artificial intelligence is actually just machine learning,” she replied.

“I’ve also heard the term ‘narrow artificial intelligence’,” I replied.

“Yeah, that works,” Dr. Nara replied. “None of the so-called artificial intelligence we have is capable of thinking for itself.”

“That fact is very evident in those hypothesis engines we tried out,” Dr. Williams noted.

“Yeah. Those systems are built in a similar way to how we use artificial intelligence to play chess. The AI outputs a series of predictions and then the best move is selected,” Dr. Nara explained.

“And the Terminator is built on, what was it called, strong artificial intelligence?” I asked.

“Yes,” Dr. Nara replied, “or artificial general intelligence. I think some people even use the term transformative artificial intelligence. They’re all loosely defined as an intelligent agent that can understand and learn any intellectual task that a human being can. Or a system capable of reasoning, planning, learning, communicating, and representing common sense knowledge, and with the ability to integrate those skills towards common goals.”

“We don’t have that yet, if I understood correctly,” Dr. Williams noted.

“Yet?” Dr. Kallas asked.

“Yeah. There are some who think we’re close to solving it. But we don’t have it yet,” Dr. Nara answered.

“How will we know when we do have it?” Dr. Williams asked.

“There are several tests designed to confirm whether human-level AGI has been created. One of those tests is the coffee test. It represents a task easily solvable by any human. But we haven’t seen AI pass this test yet,” Dr. Nara explained.

“The coffee test?” Dr. Kallas replied. “Like tell us whether coffee is good or bad?”

“Not quite,” Dr. Nara responded. “The test is quite simple, really. A machine must enter an average home and make a cup of coffee. It sounds easy to us, but for a robot, it’s a nightmare.”

“How so?” asked Dr. Kallas.

“Well, the robot must find a coffee machine, plug it in, find the coffee – which may be in a cupboard, find the tap, turn it on, fill the machine, turn the tap off, find a filter, put it in the machine, add the grounds, switch the machine on, find a mug, find milk from a fridge, and well, you get the idea. The point is humans can do this task without even thinking. And if they’re not doing it first thing in the morning, they can probably hold a conversation at the same time.”

“Okay, so that explains why we don’t have robot home assistants that can clean up, do laundry, cook, and, importantly, make coffee for us,” Dr. Williams stated.

“Exactly,” Dr. Nara replied. “And your Roomba doesn’t count.”

“And how far away from having robot assistants are we?” Dr. Kallas asked.

“Nobody knows for sure. Some people think a few years. Others think it’ll take decades,” Dr. Nara answered. “However, when we do finally create artificial general intelligence, it is suggested that it will likely exhibit thought processes as alien to us as those exhibited by insects.”

“What did you just say?” Dr. Kallas asked. “As alien to us as insects? That doesn’t sound very friendly. Especially if it’s what’s controlling my home assistant robot!”

“Precisely. And this is why some people are reluctant for us to ever develop artificial general intelligence,” Dr. Nara replied.

“Do you think we should develop it? I asked.

“Well, as a former AI researcher, I’ve always been for it. However, there are certain caveats that worry a lot of people in the field,” she replied. “Artificial superintelligence is one of them.”

“We’re familiar with the concept of artificial superintelligence,” Dr. Williams stated. “We have discussed it in relation to the Fermi paradox.”

“Okay, good,” Dr. Nara replied. “I think there are some obvious holes in the idea that an artificial general intelligence will always, and very quickly become an artificial superintelligence.”

“You and Dr. Williams alike,” Dr. Kallas stated. “He considers the very idea of artificial superintelligence speculative at best.”

Dr. Williams nodded enthusiastically.

“In order for artificial general intelligence to become super intelligent it needs to be more than just a thinking machine. It needs to be able to interact with the physical world. And the online world,” Dr. Nara stated.

“Yes, my thoughts exactly,” Dr. Williams replied.

“Even if it could rewrite its code, which let’s face it is a very complex and large number of variables in a massive machine learning model, it would eventually need more compute capacity, more disk space, and more memory. We’re at the limits of all of those things when it comes to the dumb models we currently train,” Dr. Nara added. “Theory suggests that it would first occupy all systems available on the planet, and then when those no longer suffice, invent and build new and better systems for itself.”

“Inventing new technologies requires practical experimentation. That’s something you can’t do purely in simulated environments,” Dr. Williams added.

“Precisely,” Dr. Nara replied. “Regardless of how intelligent a runaway artificial intelligence is, they wouldn't be able to skip that experimentation phase, which is time-consuming. Best case scenarios would require the superintelligence to construct millions of robots that would then perform experiments in parallel.”

“Yes, and one would assume that the creators of such an intelligence would have shut it down way before that moment,” Dr. Williams added.

“What if we did create an artificial superintelligence? And it made millions of robots and improved itself exponentially?” Dr. Kallas asked.

“If an artificial superintelligence were able to self-improve unchecked, it would start to consume all resources on its home planet. Probably at the expense of other inhabitants. It would then continue to consume all resources in its own solar system, and then spread itself out into neighboring solar systems. It would then exponentially spread to all stars in the galaxy, and when all resources in its home galaxy have been consumed, ultimately go on to consume the entire universe, again, at an increasingly exponential rate. All of this would happen in a relatively short amount of time, in relation to geological timescales,” Dr. Nara replied.

“And therein lies the rub,” Dr. Williams added. “If artificial superintelligence were possible, we’d not be here talking about it. Because it would have already happened somewhere within our universe, and our planet would not exist.”

“Yes, we discussed this many years ago. I remember,” Dr. Kallas replied. “However, it might be that we’re living in a simulated universe created by a superintelligence.”

“By that absurd theory, what’s to stop a superintelligence from being created within that simulation?” Dr. Williams asked.

“Hmm. Yes. Yes, you have a point there,” Dr. Kallas replied. “More drinks, everyone?”

That conversation was the first of many that evening. And we ended up staying until last call. We chatted about recent public QUERY discoveries, adjacent research, Dr. Nara’s previous artificial life research, and theories about how to solve the remaining piece of the pillar puzzle. We were all aware of that fact that we’d probably overdone it, and that the next morning would be painful. But that’s how things sometimes go.

Chapter 14 The Quest, part 2

The next morning, those of us who’d spend the evening at the pub arrived a little later than usual. We were all nursing hangovers of various degrees. And Dr. Madson, who was already at the lab, and who had already apparently consumed an entire pot of coffee, immediately noticed our diminished conditions.

“Been in the wars?” she asked.

We all sort of wearily nodded and shuffled to our desks.

Upon arriving at his desk, Dr. Williams produced a kebab from his backpack and started eating it.

“Really?!? A kebab for breakfast?” I asked.

“Yeah! I always get two on the way home. Standard practice. One for now and one for later,” he replied. “And besides,” he said with a mouthful of food, “they’re not open this early in the morning.”

The smell of the kebab made me hungry.

“I think I might have a theory about those extra numbers!” Dr. Madson stated excitedly. “It came to me in the shower this morning!”

“Tell us more!” Dr. Nara asked.

“I was thinking about the arrangement of those pillars,” Dr. Madson stated. “They look like rays coming from the sun.”

“Go on,” Dr. Kallas replied.

“So, I thought, what if those values are somehow related to spectral emissions?” she added.

“Ahh. But spectral emissions are measured in Earth units. Cycles per second. Seconds are an Earth-based measurement,” Dr. Williams replied.

“Yeah. I know that! Dummy!” Dr. Madson replied. “But what if there’s a way of translating those numbers into values we use to represent spectral emissions?”

“That should be possible. Are all those values positive?” I asked.

“They aren’t. However, if you add the opposing north-south values for each puzzle, they become positive. And then they create a range that seems to match our own when considering spectral emission values of stars we’ve observed. I checked it out before you guys arrived,” Dr. Madson replied.

“Okay, so how does that help solve the next part of the puzzle?” Dr. Kallas asked.

“Well, if we can map those numbers to our own spectral emission system, maybe we can use it to find a specific star in the vicinity of those puzzle planets that matches those emission lines. And if we find it, we have a new location to check,” Dr. Madson posited.

“An intriguing idea,” I replied. “So, by adding those numbers, we now have nine values that might represent stellar emission lines. We only need to translate the values into something familiar to us?”

“Yeah. I was hoping you guys might be able to do the math!” Dr. Madson replied.

“Okay, well, give us a moment and we’ll assist you,” I replied.

“Roger that! I’ll put on a new pot of coffee!” Dr. Madson replied.

It took some time for Drs. Williams and Kallas to write the code that mapped the values Dr. Madson had obtained into human-based emission values. And then the code that enumerated all stars in the vicinity of the planets hosting the pillars, checking for similar emission lines. However, after running the program, it found exactly one match within seconds.

“Okay, we’ve found a candidate system,” Dr. Kallas stated. His normal level of excitement was slightly suppressed by his hangover.

“We’ve got some scan time on one of the QUERY arrays. Let’s try looking at it ourselves,” I replied from my office.

Drs. Williams and Kallas pulled up the QUERY interface, gathered data, and passed it to the rest of us to examine. “We’re off to get a kebab. Good luck with the search,” they stated.

“Wait, but didn’t Robert just eat a kebab?” I asked. They had already left.

By the time they’d returned, Dr. Nara and Dr. Madson had already found a habitable planet in the system.

“Bingo!” Dr. Nara exclaimed. “This has to be the next clue!”

“All thanks to Dr. Madson!” I added.

“Who’d have thought a biologist could be so resourceful?” Dr. Williams added sarcastically.

“Seriously?” Dr. Madson replied.

“Now, now,” I interjected.

“We don’t have the capabilities to surface scan this planet. Send it over to SETI for help, perhaps?” Dr. Nara added.

“Yeah, let’s have SETI find the next pillars,” I replied.

The search for the next clue ended up being more difficult than any of the previous clues. According to SETI, after two weeks of automated sweeps and painstaking manual exploration of all landmasses on the planet, nothing resembling the pillars we'd found on the other worlds could be found. It took SETI three more weeks to finally identify the site, which was submerged fifty meters below sea level near a chain of equatorial islands.

The site itself was distinctly different to the ones we'd encountered on the other planets. It contained five roughly fifteen by ten meter rectangular slabs. Four were arranged side-by-side, with the fifth placed separately, a short distance to the left. Each slab was etched with a hexagonal grid. Various cells on each of the five grids were slightly raised from the surface to form different patterns. The slab located to the left of the arrangement also contained, just below the grid space, carvings of three rectangular boxes, each housing differing numbers of vertical lines - five in the leftmost, six in the middle, and one in the rightmost box.

Dr. Nara immediately understood the nature of the puzzle. “Cellular automata!” she exclaimed.

“Cellular what?” Dr. Kallas asked.

“Cellular automata,” Dr. Nara repeated. “Like Conway’s game of life.”

“Right, yeah, I think I’ve heard about that,” Dr. Madson replied.

“Basically, it’s a system with a set of rules that define how each cell is updated at each time step,” Dr. Nara explained. “Cells on the grid can be born, die, or remain as they are. Their neighbors determine what happens. If a cell has too many neighbors, it dies from overpopulation. If a cell has no neighbors, it dies from underpopulation. If a cell has the right number of neighbors, it will live on or even give birth to a new cell. Once the new state of every cell on the board has been calculated, cells are added, removed, or simply left alone. Once all states have been updated, the rules are run again, and the cycle repeats.”

“Yes, I recall seeing those game of life animations. Certain shapes would move around the board, generate offspring, or oscillate in interesting ways,” Dr. Madson replied.

“From what I’m seeing, this problem is straightforward to solve,” Dr. Nara stated. “We need to determine the ruleset that converts what is depicted in the leftmost slab into each of the depictions in the other four slabs. The number of steps is denoted by those vertical lines – five hundred and sixty one to be precise. We’ll need a computer to do this.”

“I’m on it,” Dr. Williams replied.

“A set of all possible rules governing the behavior of cellular automata on a two-dimensional grid can be represented as a binary number,” Dr. Nara explained. “Once solved, these problems should provide us with four unique integer values.”

“Okay guys. We need to first create a computer program able to simulate cellular automata on a hexagonal grid. Then we need to set the starting configuration to match the one depicted in that leftmost stone slab. Next, we iterate through all possible rulesets one by one, running the simulation for exactly five hundred and sixty one steps. Finally, we simply check if the simulation's end configuration matches a pattern depicted on one of the other four slabs. If it does, we convert the binary representation of the rule into a decimal number.”

It took Drs. Nara, Kallas, and Williams the rest of the morning to program a simulation of the grid represented in the puzzle and associated code to run the cellular automata rulesets. The program took just a few seconds to generate the four numbers.

“Interesting,” Dr. Williams stated. “Whilst the pillar puzzle relied on the solver having developed enough mathematical knowledge, this puzzle forces the solver to have created computers.”

“Four numbers don’t exactly represent a coordinate system,” Dr. Kallas stated.

“Unless those coordinates are in four dimensions,” Dr. Williams replied.

“Wait. Don’t our QUERY systems take four coordinates?” Dr. Madson added.

“They do. But these numbers are small integers. They wouldn’t correspond with anything meaningful,” Dr. Kallas replied.

“We clearly need some sort of transformation,” Dr. Nara added.

“Perhaps there are clues in the area where those slabs were located?” Dr. Madson asked.

Unfortunately, examining the slabs in detail and searching the surrounding area didn't uncover any new clues. It was already late, and we were about to give up for the day when Dr. Kallas had a flash of inspiration.

“I’ve been playing around with various transforms,” he said. “If I multiply each of the numbers by five hundred and sixty one and by the distance between this planet and its host star, I get values that correspond with a reasonable looking set of QUERY coordinates. However, I ran the scan and found nothing.”

“Did you use Earth as the origin?” Dr. Nara asked.

“Yes. Oh, of course. What a stupid error,” Dr. Kallas replied. “I’ll set the origin to the planet where we found the slabs. One second.”

Dr. Kallas calculated new coordinates accordingly, input them into our QUERY array, and activated the scan.

Chapter 15 The Quest, part 3

The resulting QUERY scan presented us with a location in space containing fifty one stone cubes spinning about all three axes and moving about each other in a series of different orbits and gyrations. Glyphs were inscribed on each cube face.

“Wow!” exclaimed Dr. Nara. “I wasn’t expecting this!”

“Yeah, what the hell is this?” Dr. Kallas replied.

“If this is yet another a puzzle, it looks to be a lot more complex than those previous ones,” Dr. Madson added.

“I wonder if those objects are moving chaotically or deterministically,” Dr. Williams stated.

“I’m thinking we could spend hours watching this motion and not see any patterns or repetition,” Dr. Kallas replied. “In order to determine whether there is any determinism in their movement, we’d need to simulate the entire system.”

“Perhaps that’s what is intended,” Dr. Williams replied. “Think about it. The first puzzle required mathematics, the second required computers, perhaps the third requires advanced computing, predictive analysis, and even machine learning.”

“That would follow,” Dr. Kallas replied. “I suppose we could capture the exact spatial and rotational positions of all cubes over a period of time, and then use that data to determine the forces they apply to each other.”

“Yes, that’s what I was thinking,” Dr. Williams replied. “We’d need at least a few hours’ worth of data…”

“Maybe even a few days’ worth,” Dr. Kallas replied.

“Let’s get to it!” Dr Williams stated.

“You’ll probably need my help,” Dr. Nara stated. Drs. Williams and Kallas were in the zone and hadn’t expected Dr. Nara’s input.

“Wha? Huh? In what way?” Dr. Williams replied.

“Well, it would be trivial to use machine learning to predict the variables at play in this system,” she replied.

“It would? Ahh yes, of course it would,” Dr. Williams replied. “Okay, let’s set up over there.”

It took the three of them a week to obtain an understanding of the physical forces at play in the system of spinning cubes. After which, they summoned us all to a meeting.

“Do you want the good news or the good news?” Dr. Williams said, grinning widely.

“The good news first!” Dr. Madson replied.

“Okay, so we’ve studied the system. And thanks to Dr. Nara’s machine learning thingy we’ve concluded that the system is completely deterministic!” Dr. Kallas excitedly stated.

“Okay, that’s nice,” I replied, rather skeptical about their shared excitement. “So how does this help us solve the puzzle?”

“We’ve used the variables gathered to create our own simulation of the system,” Dr. Williams added. He hit a key on his laptop and a computer-generated simulation of the spinning cubes lit up a nearby screen.

“Tell him the good bit already!” Dr. Kallas exclaimed.

“We were able to run this simulation on fast-forward, which allowed us to extrapolate the positions and orientations of the cubes over a very long time,” Dr. Williams added. “And we found that, if run for long enough, we encounter this state.” He hit another key on his laptop. An image appeared on the screen depicting a state in which all cubes were aligned in the same direction.

“Those glyphs are the same ones encountered in the pillars puzzle, right?” I asked.

“Yes! Exactly! So, this sequence of glyphs must be the key to solving this puzzle!” Dr. Williams replied.

“Do you have any insights on how we might continue?” I asked.

“I believe the answer is in the spatial positions of the cubes relative to each other,” Dr. Kallas replied. “The glyphs can be ordered in many ways to represent valid mathematical notation. We need to determine the correct order of those glyphs to produce an algorithm that will output the numerical values we’re expecting will further the solution.”

“Can we brute-force it?” I asked.

“No. There are fifty one glyphs. The number of potential sequences available is astronomical,” Dr. Nara replied.

“We’ve hit another wall, I take it?” I asked.

“Yes, it seems so,” Dr. Kallas replied.

A few weeks passed. Dr. Nara attempted to use machine learning to discern a pattern in the spatial arrangement of the cubes. Drs. Kallas and Williams tried to match known algorithms and formulae to the symbols denoted by the blocks, hoping the formula was already known to us. Nothing worked. And then it was Dr. Madson who, once again, had an insight that would prove to be correct.

“You know, I was thinking about the pillar puzzle and how it was to do with stars,” she said.

“And I realized that stars might be the key to solving this puzzle. So, I tried to match the relative positions of those cubes with the spatial arrangement of stars in the puzzle’s local vicinity. It worked.”

She brought up an image that showed the cubes’ positions overlayed on star positions in that region of space.

“At first, I thought we might need to look at spectral emissions. Like we did previously. I spent a bunch of time doing that, but none of the data made any sense. It turns out the answer was much simpler. I ordered the stars by size and then mapped the glyphs onto the same sequence,” she added. “Here’s the glyph order it produced.”

She brought up the glyph sequence. “And here’s the same sequence mapped to our own mathematical notation.”

“That appears to be a valid formula,” Dr. Kallas stated. “Did you solve it?”

“Do I look like a mathematician?” Dr. Madson replied.

“But of course!” Dr. Williams replied in a sarcastic tone. “They don’t teach math in biology school!”

“Really? I just solved your puzzle and you’re going to start on biology?” Dr. Madson replied.

“Why don’t you and Riks go and solve that equation?” I said to Dr. Williams.

They both nodded and left the table. A few hours later, they announced to the lab that they’d solved the equation. But that it had yielded only one number.

“Not coordinates, then?” I asked.

“No. This is the first time we’ve seen a single number from one of these puzzles,” Dr. Kallas replied. “Frankly, I’m stumped as to what it might represent.”

“It’s a very large number,” Dr. Williams added.

“Are you sure the solution was correct?” I asked.

“Yeah, we triple checked it. We also went over Dr. Madson’s work to make sure the glyph ordering was correct. It was,” Dr. Kallas replied.

“I have a thought,” Dr. Nara replied. “Given we had to wait time to observe the cubes in this alignment, might this value represent some sort of time stamp?”

“I think Kano is onto something,” Dr. Williams replied. “The problem in this case would be determining both a point of reference and a unit of measurement.”

“Yes. You see, our methods for measuring time are fundamental to our own planet and culture. Seconds, days, weeks, months, and years are concepts based on the size and

movement of the Earth, and would therefore be irrelevant to the final solution,” Dr. Kallas added.

“I knew that!” Dr. Nara replied. “There are plenty of ways of measuring time that aren’t inherent to the Earth. For instance, nuclear time is based on the oscillation rate of the cesium atom. Then there are half-lives of various radioactive elements. Or the amount of time it takes light to travel a defined distance.”

“How about the Planck length?” Dr. Kallas posited. “The number is very large, so Planck time could be the unit of measurement...”

“Planck length?” Dr. Madson asked.

“Planck length is the shortest unit of distance measurable,” Dr. Kallas replied.

“And Planck time is the time it takes for light to travel the Planck length,” Dr. Williams added. “None of our current physical theories are able to describe timescales shorter than Planck time. It’s like the structure of time just sort of breaks down at shorter intervals.”

“I’d never heard of those,” Dr. Madson replied.

“Well, I’m sure that’s one of the many things they didn’t teach you in biology,” Dr. Williams replied.

“Wait. Does that mean that spacetime can basically be broken down into pixels and frames?”

Dr. Nara asked.

“Come to think of it, yes. It does,” Dr. Kallas replied.

“Wouldn’t that be a good argument for the simulation hypothesis?” Dr. Nara asked.

“Don’t get Robert started on the simulation hypothesis!” Dr. Kallas replied.

“Yeah, let’s leave that can of worms for another time,” I replied.

Dr. Williams looked up. “Wait!” he said excitedly, clicking his fingers. “There’s only one possibly frame of reference that would make any sense. A value anyone at the level of advancement needed to solve this puzzle would have already accurately measured. It has to be the big bang!”

Drs. Kallas and Williams performed some quick calculations, converting the numerical value obtained from the puzzle into a human-understandable timestamp.

“Is this right?” Dr. Kallas asked.

“Hmm. That timestamp is hundreds of thousands of years in the past. It can’t be right,” Dr. Williams replied.

“Maybe it is,” Dr. Nara posited. “In order to obtain the clue to obtain this timestamp, we had to let the cube simulation predict a configuration thousands of years into the future. Perhaps what this is telling us is that we need to observe the configuration of these cubes thousands of years in the past.”

“That sounds logical,” Dr. Kallas admitted. “So, we’d have to make a simulation that can run backwards?”

“Yeah,” Dr. Nara replied.

“That shouldn’t be too difficult,” Dr. Williams replied. “Just give me a few minutes.” He’d already started typing away at his laptop. A few hours later, Drs. Williams, Kallas, and Nara informed us rather loudly that they had snapshotted the configuration. They brought it up on screen. It portrayed nine sets of cubes, with exactly three cubes in each set, all spatially aligned to a specific direction. Viewing the cubes from the correct angle allowed us to draw lines through their centers. Those lines, when extrapolated, eventually intersected, providing us with a total of three intersection locations. We performed QUERY scans on all three locations but found them all to be in empty space.

“Huh. I was really hoping that would have been the solution,” Dr. Kallas stated. He sighed.

“This is just one never-ending wild goose chase.”

“What are we missing this time?” Dr. Williams replied.

“The timestamp,” Dr. Nara replied. “We’ve extrapolated those locations to points in space that exist right now. Logically, we need to do the same thing but for points in space at the moment the timestamp indicates.”

“That would require a model that is able to predict the positions of stars and planets in the distant past. I’m not sure if such a model even exists,” Dr. Kallas replied.

“We made a model years ago that was designed to predict galactic movement over long time spans. I wonder if it could be adapted for this purpose?” I asked.

“Oh yeah, I remember working on that. Isn’t it still operational?” Dr. Williams added.

“It is. And I know the team that maintains it. I’ll get in touch with them,” I replied.

It took the work of both our team and the team maintaining the galactic positional prediction model over a month to create a new model capable of accurately predicting the configuration of the stellar neighborhood adjacent to the cube puzzle at a moment in the distant past. But when it was complete, we determined that the intersection lines did indeed pass through three stars at the moment of the timestamp. We were about to commission extensive QUERY searches of their solar systems when Dr. Madson suggested we try other, simpler methods first. And it turned out that each of the stars had spectral emissions lines in common with each other. Four of them, to be precise. Another four values to plug into QUERY. Given that the previous puzzles had provided us with a way of converting the alien’s spectral emissions values into our own, we performed a reverse conversion on the values obtained, shifted the

point of origin to the location of the cube puzzle, pointed the QUERY array at those new coordinates, and initiated the scan.

Chapter 16 A formal request

It took a moment for the QUERY scan to initialize and then send us data. We brought the image up on a large screen in the lab.

“Empty space again!” Dr. Williams complained. “Give me a break. Where did we go wrong this time?” He sighed and then started frantically typing on his laptop keyboard.

After months and months of solving increasingly complex puzzles, we were all exhausted. We all clearly felt the same sense of disappointment and frustration Dr. Williams’s had expressed. Silence fell across the lab.

“Perhaps we have the resolution set incorrectly?” Dr. Kallas posited. “Our previous scan was at a rather low resolution. I’ll make some adjustments.” Dr. Kallas got up and started making his way to the QUERY control console. And he was about halfway there when something completely unexpected happened. A written message, in English, appeared on the QUERY output display.

"We are one of the alien races you have been searching for. We have been observing your species for some time. We would now like to initiate formal contact."

The message remained on our viewer as the whole room read it in silence. You could have heard a pin drop.

“What the actual fuck?” Dr. Nara exclaimed.

“For real?” Dr. Madson added.

We all looked at each other.

“This can’t be real,” Dr. Kallas stated.

“This has to be some sort of elaborate prank from one of the other QUERY teams on our floor,” Dr Nara posited.

“Yeah, there’s no way this is real,” Dr. Williams added.

“But what if it is?” Dr. Madson asked.

“If this is a real message, whoever sent it is obviously capable of observing us with their own version of QUERY. And let’s face it, for them to have crafted those puzzles and project those images directly into our own QUERY feed means that they’re clearly a lot more advanced than us,” I replied.

“But why us?” Dr Madson replied. “We’re not the right people to be negotiating an intergalactic treaty. They should know that.”

“Exactly!” Dr. Williams added. “And that’s why this is clearly a hack!” he exclaimed. “Riks, help me out here.” Drs. Williams started to type furiously on his laptop while Dr. Kallas watched his screen. And at that moment, the QUERY display changed.

"We understand that this situation must be difficult to believe. And we also acknowledge your need to involve an appropriate ambassador or delegation for more formal discussions. You can communicate with us by simply speaking. We are observing you just as you are able to observe remote locations in the universe using your own remote viewing technology. If you have any further questions, just ask."

“I still think this is some sort of elaborate and well-planned practical joke,” Dr. Williams shouted. “We’ll soon trace your IP.”

“What if this isn’t a prank?” Dr. Nara asked. “What if this is first contact? Should we really be so skeptical? This is, after all, what we’ve been working towards!”

“First contact my ass!” Dr. Williams exclaimed. “Anyone with a QUERY device could be watching this lab. Right now. And they’d be able to answer any question we throw at them.”

“Okay,” Dr. Madson stated. “Suppose they are aliens. And they’ve been observing us just as we’ve been observing many other species. They’d have had plenty of time to master our language.”

“Or translate it using machine learning techniques we developed ourselves years ago,” Dr. Nara interjected.

“Right!” Dr Madson replied. “Remember the zoo hypothesis?”

“Zoo hypothesis? Those puzzles we solved were rudimentary. There’s no way they’re the gateway into an alliance of super-advanced alien beings,” Dr. Williams retorted. “No, this is, without a doubt, some form of practical joke. I’m certain of it!”

“Robert’s right,” Dr. Kallas replied. “I could imagine Dr. Wright’s team, Dr. Smith’s team, Dr. Young’s team, or a dozen other teams pulling a stunt like this. In fact, I wouldn’t be surprised if they worked together on it.”

The text on our viewscreen changed again.

"How can we convince you that we are who we claim to be?"

“Okay, Robert. If you think this is a practical joke, come up with something they won’t be able to answer.” Dr. Madson replied.

“Any question about Earth’s history would be known to us and the pranksters,” Dr. Nara replied. “Or they could just do an internet search for it. So that’s out of the question.”

“Questions about advanced alien tech could be answered in any way the pranksters please,” Dr. Kallas added. “Pretty much anything might as well sound convincing to us.”

“Personal questions will largely depend on how long the aliens have been watching us as individuals. They’d depend upon whether they’d observed specific moments from our past,” Dr. Madson added. “So, probably a no go.”

“How about we ask them to provide a proof to a currently unsolvable mathematics or computer science problem?” Dr. Kallas asked.

“Nah, that wouldn’t work. It would take us way too long to validate any proof,” Dr. Williams answered.

“Facts and figures about the universe could be looked up by anyone playing a joke on us,” Dr. Kallas added. “And if those figures are unknown, any random value could be provided, and we wouldn’t be able to verify it.”

“We can’t even ask them something about the set of puzzles we’ve just solved, since anyone on Earth with a QUERY device could have theoretically been watching as we’d solved them,” Dr. Nara added.

“This is more difficult than I imagined!” Dr. Williams exclaimed. “How the hell do we determine the difference between a practical joke and actual first contact?”

“Wait! I have a suggestion” Dr. Madson stated. “How about ask them to send us real-time footage from their home world?”

“But this system we’re interacting with only seems to display text,” Dr. Kallas replied.

“We’re supposedly dealing with super advanced aliens. Do you really think they would have created a system to communicate with us that can only handle text?” Dr. Williams asked sarcastically.

“And besides, if they could show us video, it would kinda go towards proving they are super intelligent aliens,” Dr. Nara replied.

“Riks, do you think those teams you mentioned would be able to synthesize video on demand and project it through this QUERY image?” I asked.

“No. I think that would be a tough ask,” Dr. Kallas replied.

“In that case, I think Rachel’s that idea might check out,” Dr. Williams replied. “It would take time and creativity to generate video of that ilk. And we’d probably be able to tell it’s fake by looking at it. Okay, let’s go with that.”

We unanimously agreed.

A moment later, the QUERY display switched to what we'd asked for. The footage we received was of what we imagined must have been one of their cities. It depicted a flyby of a massive dome, stretching so far into the sky that clouds broke around it. Inside the dome we observed many arrangements of large, disc-shaped floating structures. Each floating level contained buildings and park-like areas. The camera panned around some of the floating structures and then moved rapidly to ground-level. We observed thousands of alien beings

moving around, conversing, and interacting with vendors in hundreds of small markets. The flyby camera continued, at a rapid pace, through bustling streets and indoor areas containing stalls selling food products, ornaments, clothing, paraphernalia, and unidentifiable high-tech devices. The view panned around, and then rapidly ascended to an altitude that provided us with a view of the entire settlement, which contained hundreds, or maybe even thousands of floating structures, likely capable of housing millions of residents. Although the entire sequence lasted about thirty seconds, it provided us with a taste of their culture, prosperity, and level of technological advancement. We didn't get a good enough look at the species to be able to describe them due to the speed of the camera's fly-by. And once the footage had concluded, a new message appeared on the screen.

"We hope this convinced you as to our sincerity. Please do ask us more questions."

"Well, that was pretty convincing," I stated.

"Yep. There's no way that video could have been generated so quickly, and on-the-fly by any of the teams I know," Dr. Kallas added.

"The level of detail in that footage clearly rules out any AI-generated shenigans," Dr. Nara stated.

"I'm still skeptical," Dr Williams added.

"You're always skeptical," Dr. Madson replied. "What will it take to convince you?"

“I dunno,” Dr. Williams replied. “Perhaps if they materialize me a pizza. I’m quite hungry.”

We stopped talking and looked around the room shortly after he’d made the request. No pizza appeared.

“They’re aliens. They probably don’t have pizza,” Dr. Kallas stated.

Majority consensus in the room seemed to indicate that we all believed the conversation was real. We’d made first contact with an advanced alien species. And they were communicating with us via QUERY. It was a surreal experience, and one I’ll never forget.

“Okay, then,” I stated. “Let’s ask some questions!”

“I’ll go first!” Dr. Nara stated.

“How long have you been watching us?” Dr. Nara asked.

Over 6000 of your years.

“Holy hell, that’s a long time,” Dr. Nara stated.

“Yeah, that goes back to before the ancient Egyptians,” Dr. Madson added.

“That means they developed QUERY at least six thousand years ago!” Dr. Kallas remarked.

“I wonder how long ago they invented it?”

“Perhaps you should ask them,” I replied.

“Oh, duh. Of course. How long ago did you develop QUERY technology?” Dr. Kallas asked. Well over one hundred thousand of your years ago.

A few of us gasped at reading that response. We had expected to meet a species perhaps a few thousand years more advanced than our own. But a hundred thousand years more advanced? We considered how far we’d come technologically in just ten thousand years – from the stone age to where we were now. That stretch of time was just one tenth of their technological journey.

“Over one hundred thousand years,” Dr. Williams stated. “That’s interesting from the point of view of the Fermi paradox. It turns out it was correct regarding the supposition that technological species much older than our own must exist in the universe.”

“In what level of detail have you been watching us?” Dr. Williams asked.

That varies. Automation was mostly used during your early history, which provided us with periodic summaries of your development, global events, and probabilities of catastrophe on the planet. Standard practice for most of the planets we observe. We paid more attention to your species recently and have followed your astrophysical discoveries closely. It has been a nostalgic moment for some of us.

Dr. Williams read silently from the screen and then repeated one of the phrases displayed there. “...a nostalgic moment for some of us...”

“How old do your species live?” He asked.

That’s a complex answer. We originally had lifespans a little shorter than your own. Medical advancements made over the millennia now allow us to extend our lifespans almost indefinitely. We use augmentation. Every one of our species carries implants that record and preserve our brain patterns, memory, and knowledge. Those can be transferred into another being in the event of accidental death.

“Have you ever visited us?” Dr. Madson asked.

Yes. On several occasions. Mainly for anthropological research.

“In many science fiction stories, visiting technologically backward species is prohibited,” Dr. Kallas stated. “The prime directive in Star Trek, for instance. I wonder if they have guidelines or laws regarding cultural contamination of lesser-developed species?”

We’ve adopted laws and conventions, common to those we cooperate with, that prohibit major interference in the development of lesser civilizations. Those laws are relaxed enough to allow cultural anthropologists to visit and study cultures in early enough development stages. In fact, we’ve developed systems able to predict the impact of interactions with members of a lesser species. Those systems provide guidelines for visiting researchers. Technological exchange is only permitted with species that have reached a certain level.

“Have we reached the level of advancement that allows for technological exchange?” Dr. Nara asked.

Yes. This is why we reached out to you.

We asked our questions to the ceiling. As if the entity we were communicating with were looking down on our lab. It was, in hindsight, completely silly. But it turned out to be sort of a natural reaction to the situation.

“As I was thinking,” Dr. Williams interjected. “Those puzzles we just spent the last nine months and countless hours of overtime on had nothing to do with our contacting an advanced alien species.”

“Wait, what?” Dr. Nara replied. “What do you mean?”

“If I understand Robert correctly, he’s suggesting that it was our invention of QUERY that prompted this encounter,” Dr. Kallas replied.

“Not just QUERY. I stated that it was our level of technological advancement that qualified us,” Dr. Williams replied. “So, are we correct in that assumption?” he asked the ceiling. You are correct.

“So why the puzzles?” Dr. Williams asked. It took a while for the answer to appear on the screen.

Think of it as a test of your curiosity and drive to contact another species.

“Have other species visited us?” Dr. Madson asked.

Yes. Many others have visited your planet. You might find mention of those visitors in surviving ancient texts and imagery. We are even aware of visits as far back as your Jurassic period.

“Jurassic period?” Dr. Madson exclaimed. “That was over sixty five million years ago!”

“Are you planning on visiting us in the near future?” Dr. Nara asked.

Yes. We will visit soon.

“Where is your home world located?” Dr. Williams asked.

We'll explain that later.

“But of course,” Dr. Williams exclaimed after reading their reply.

“Will it be possible for us to visit your home world in the future?” Dr. Kallas asked.

Yes. We'll bring you to our world in due time.

“You talked about starting a cooperation with our species. How many other species are you cooperating with?” Dr. Madson asked.

Our alliance currently contains 4,232 other species.

“That's a lot!” Dr. Nara stated.

“Yeah. I wonder how many are noobs like us and how many are tens of millions of years more advanced than us?” Dr. Kallas posited.

“Look on the bright side – better to be in an alliance with aliens millions of years more advanced than us than to be their enemies,” Dr. Madson replied.

“We’ve left out a fairly obvious question. What is the name of your species and your home world?” I asked.

Something we’d eventually learn was how the aliens converted their language into something we could read, write, and pronounce. As it turns out, conversing with an alien species is more difficult than one might imagine. For instance, their own language was impossible for humans to pronounce. As such, even answers to simple questions like "what is the name of your race?" or "what is the name of your home world?" were untranslatable. We weren't the first alien species our new allies had made contact with, and, as such, they'd devised a protocol for handling such dilemmas. As part of their research into our race, local linguists had been tasked to assign syllables, common to languages on our planet, to their own written languages such that their words could be pronounced by us, regardless of native tongue. And so, we learned that they called themselves "Eilanas" and their home world was called "Beta".

And, eventually, as part of our technological and cultural exchange, xenolinguists from Earth were provided with courses on how to read their written language. Although their workaround to spoken language helped facilitate smooth written communication, it wouldn't help in any face-to-face encounters with the Eilanas, if they were to eventually happen. We suspected they'd simply use voice synthesis systems as intermediate translators when conversing with us.

“Is there anything else you can tell us about your species or alliance?” I asked.

We’ll disseminate more later.

“We should have prepared for this beforehand. You know, written a list of stuff to ask,” Dr. Nara stated.

“Yeah, I’m kinda out of questions at this point,” Dr. Madson replied.

“Me too,” I added.

“I still have plenty of questions!” Dr. Kallas stated.

“Go ahead, then!” I replied.

“Is warp drive possible?” Dr. Kallas asked.

As we understand the concept from references to your science fiction, yes. But it isn't the most efficient method for long distance space travel.

“Did you really have to ask a Star Trek question?” Dr. Williams interjected.

“It was a perfectly valid question!” Dr. Kallas replied.

“Perfectly valid my ass. Next, you’ll be asking about transporters and food replicators!” Dr. Williams replied.

“And why not?” Dr. Kallas replied.

“Well, because...” Dr. Williams replied. “Oh! Wait! I have a valid question!”

“Is time travel possible?” Dr. Williams asked.

Sort of. You'll need to learn more before it can be adequately explained to you.

“I'm going to ask it anyway. Is it possible to beam people up?” Dr. Kallas asked.

Yes. Your science fiction writers were quite good at predicting useful technologies.

“Well, if that it possible, I suppose the question about food replicators is redundant,” Dr. Kallas added.

“They'd better not beam me up,” Dr. Williams stated. “I don't want my molecules being disassembled and then reassembled elsewhere.”

After a slight pause in the conversation, Dr. Williams broke the silence. “Oh, no!” he exclaimed.

“What?!?” Dr. Kallas replied.

“What is it, Robert? What is it?” I replied.

“We're going to have to talk to McTavish.” Dr. Williams replied.

Chapter 17 On the nature of paperwork

Generally speaking, Professor McTavish wasn't someone you could simply summon on a whim. Booking a meeting with him took weeks. Sometimes months. However, in this

particular instant, it took him seconds to drop everything and rush to our lab. Upon arrival, we provided him with a detailed account of everything that had happened. And after understanding the situation at hand, he agreed to help out in any way that he could.

This was the first time he'd spent more than two minutes in our lab. And he was much less abrupt and brash than usual. He almost seemed happy. None of us had ever imagined he was capable of that emotion.

During the following days, Professor McTavish turned out to be the perfect ally. And much more helpful than we'd ever imagined. He immediately got in touch with his contacts, who got in touch with their contacts. And before long, negotiations were handed off to people way above our pay grade.

The idea that we might one day make contact with an advanced species had been considered shortly after QUERY was invented, and an entire UN task force had been pre-emptively assembled and trained to handle such a scenario. After Professor McTavish had made his calls, the task force was promptly activated, and took over all negotiations and diplomatic efforts with the Eilanas. We configured a QUERY node for them and pointed it at the location we had discovered after solving the final puzzle. And then they continued where we'd left off.

Unfortunately, the fact that negotiations had now been handed over to a higher body meant that our team was forced out of the loop. We would have much preferred to continue talking one-on-one with the Eilanas about scientific matters, but we were promised that we would be able to resume our discussions sometime in the future.

During the early years of QUERY, it was quickly understood that anyone using the technology may be involved in potentially world-changing discoveries. Even back then, many research groups from around the globe were either directly working with QUERY devices or examining data collected by them. Within the first year of technology being proven, a standard non-disclosure agreement was drafted, and subsequently issued to all researchers involved. That legal document, which is periodically updated as QUERY capabilities are improved, is referred to as the "Standard QUERY NDA". Many researchers protested at the idea of signing this NDA, since it went against their ideals of openness and knowledge sharing. Unfortunately, not signing it meant not working with the technology.

As QUERY EPOCH3 and 4 were achieved, the standard NDA was amended to include prohibition of the use of the technology on Earth, and for specific purposes. A set of requirements related to ethical considerations of the observation of intelligent alien species were also added. Teams that were eventually cleared for terrestrial research were provided with special NDAs that allowed them to scan only specific regions on our own planet. All QUERY usage was carefully logged and audited to ensure rules weren't being broken, and that researchers with access to it weren't using it to spy on people, such as wives, ex-girlfriends, and the like, or to collect foreign intelligence or trade secrets.

Certain extraordinary discoveries did require additional legal paperwork to be drafted and signed by the subset of researchers involved with them. Examples of these included the discovery of the first signs of extra-terrestrial life, the discovery of the first technologically intelligent extra-terrestrial life, and HEX.

By the way, details of the HEX discovery still hadn't been shared outside of a very small circle of people. It was still being kept from the world.

Contact with a species more advanced than our own precipitated the creation of several new and even more restrictive legal documents. Naturally, our discovery of the Eilanas was kept from the public, and those documents were designed to ensure that no word of that discovery got out.

Of course, many of us would have preferred that these NDAs and legal frameworks didn't exist. QUERY research had provided us with a great deal of information relevant to the scientific community and would have preferred that it be in the hands of all scientists, and not just the select few who'd signed the NDAs.

Once negotiations had been handed off to the UN, we were provided with no updates or information on the deliberations, which was frustrating to say the least. And those negotiations took months.

As a matter of fact, I recall a discussion about those NDAs and the increasing secrecy behind our projects that we had during that long waiting period. After the hand-off, we'd returned to surveying HEX. And some time after that, Professor McTavish had graced us with his presence, briefly as usual, to belatedly congratulate us on our work in solving the puzzles and finding the Eilanas. His words weren't initially taken all that well by certain members of our team. However, he granted us some budget to go out and celebrate, which made us all a little happier. We took his offer as an opportunity to find a rather expensive nearby Chinese restaurant.

We started our evening with a few rounds of drinks.

“I feel like I spend half my time signing NDAs,” Dr. Madson complained.

“Me too,” Dr. Nara replied. “But I can kinda understand why they require it. I think EPOCH4 was the last thing we’ll disseminate to the public in a long time.”

“Yeah, I get that feeling, too,” Dr. Kallas replied. “Look at how the irrationalists took that announcement.”

“I get a feeling that the rational portion of the public would be interested and excited about some of the other things we’ve discovered,” Dr. Madson added.

“HEX would almost definitely cause mass panic,” Dr. Williams stated. “And besides, the circle of scientists involved in these projects will increase over time. We’re already severely limited in what we can achieve due to limited resources.”

“By not telling the world about some of our newer discoveries, we’re missing out on recruitment opportunities. I bet a lot more people would get interested in this field if they knew about some of the things we’re doing,” Dr. Kallas stated.

“For sure,” I replied. “But the downsides are too risky. Look at how the far right react to trivial announcements.”

“The far right are getting worse and worse,” Dr. Nara stated. “Remember when they refused vaccines and ate horse dewormer paste to cure COVID? That was super-idiotic. But it feels much more rational than the things they do nowadays.”

“Yeah, I remember that!” Dr. Kallas replied. “They posted videos demonstrating that it removed worms. But what those people were defecating was intestinal lining.”

“Oh god, really?” Dr. Nara exclaimed. “Eating that stuff sounds like it must have been bad for them. Dangerous, even.”

“Oh, it was,” Dr. Williams replied. “I think some of them died from it.”

“Many of them died from COVID. Because they refused the vaccine,” Dr. Nara replied.

“Perhaps this whole social network phenomenon is just a modern-day Darwinian mechanism,” Dr. Kallas posited.

“What, you mean bring all the irrationalists together and let them destroy themselves?” Dr. Williams replied. “I like that idea. We sit and wait for the logical conclusion to this madness.”

“Right now, the logical conclusion to this madness is an increasing number of those people having positions of influence and power,” I replied. “What that leads to is not something I’m altogether too excited about.”

“Those people were crazy back then. But their crazy didn’t harm others. Well, it didn’t harm others who weren’t part of their cult,” Dr. Nara added. “Things are definitely different now. And they’re looking to change for the worse.”

We all nodded. Things were different now. The irrationalists were much more coordinated, much more dangerous, and had significantly grown their ranks. They also had money and power. In recent years, the Republicans had taken back the presidency in the US. They also had majorities in both the House and the Senate. A large majority of their lawmakers were adherents to various irrationalist causes. Many were outwardly extremist. And just that year, a general election in the UK had ended in a hung parliament slightly in favor of the Tories who had gone on to form a coalition with an up-and-coming far-right party, basically yet another reincarnation of the BNP, that had managed to win more than a few dozen seats across England and parts of Wales. Far right government gains had also continued across much of Europe.

“Did I tell you what happened to Dr. Young, by the way?” Dr. Kallas asked, rhetorically. We all waited for his follow up. “A couple of weeks ago she flew to the US for a conference. When she arrived, she got detained at the airport for, I think forty-eight hours. Maybe more. And then she was immediately put on a flight back to Germany. She missed the whole conference. She was even due to speak at it.”

“I’ve seen many similar stories on the forums,” Dr. Nara replied.

“Did they give any reason for her detention?” Dr. Williams asked.

“Something about an anti-terrorism law, from what I remember,” Dr. Kallas replied.

Two waiters arrived at our tables with a fresh round of drinks. We ordered food. A lot of it. All the most expensive items on the menu. I knew I’d probably have to face a bollocking from McTavish in the days to come. But I was a bit tipsy and didn’t care. Future Dr. Stall would pay for present Dr. Stall’s give-a-fuck.

“Yep, same in those other cases. They all have the same pattern in common. People working in certain research areas,” Dr. Nara replied.

“What research areas?” I asked.

“QUERY-related research, for one,” Dr. Kallas replied.

“Most of the virologists I keep in contact with have been banned from social networks,” Dr. Madson added. “So, add that research area, too.”

“That happened to us in QUERY research a long while ago,” Dr. Nara replied. “AI researchers too.”

“The people who own those social media companies are either part of the irrationalist movement or are capitulating to it,” Dr. Williams added.

“Yeah, it all started a long time ago,” Dr. Nara replied. “And it got worse when that one oligarch took control of one of the most popular social networks on the internet.”

“Yeah, I remember that,” Dr. Kallas replied. “He spent his time sucking up to right wing sex traffickers, paedophiles, and other scum. And trolling everyone else.”

“I hear they have a lot of those types in high-up positions,” Dr. Nara replied. “Directors of policy, content moderation, and that sort of thing. They also lobby a lot. So, they have to toe the line.”

“Everyone seems to be capitulating to them. Did you see the news that they’re trying to pass laws banning certain areas of research in the US?” Dr. Nara stated. “That includes QUERY research.”

“What?” Dr. Williams replied. “When did that happen?”

“Today,” Dr. Nara replied. “Their reasoning is the certain fields of science are anti-Christian.”

“Anti-Christian?” Dr. Kallas replied. “That place is going to be Gilead soon.”

“Does it surprise you?” Dr. Nara asked. “They’ve been banning books for years. The free speech people only want speech to be free when it suits their agenda.”

“Okay, this is definitely bad,” Dr. Williams stated. “Soon there’s going to be nowhere safe to do any scientific research.”

We all nodded in agreement. The conversation paused for a moment as waiters arrived with some starters.

“Oh, did you read about the standoff between the US and China?” Dr. Madson asked.

“Which one?” Dr. Nara asked.

“The one in the South China Sea,” Dr. Madson replied.

“Yeah, I think I read about that today. The new US administration had sent a shit-load of navy there?” Dr. Kallas replied.

“That’s the one,” Dr. Madson replied. “Doesn’t look good.”

“Yeah, yeah,” Dr. Williams replied. “That standoff has been going on for years. I’d think nothing of it.”

“Think nothing of it?” Dr. Kallas replied. “The rhetoric has been going on for years. But this is an escalation. The US stopped whining about the situation and is now sending their navy. A navy controlled by an extremist government. In what way can that possibly end well?”

“Oh, come on,” Dr. Williams replied. “The US are saber-rattling. They won’t follow through. Not with China. It’s all just posturing.”

“Posturing?” Dr. Kallas replied angrily. “Remember how Russia was ‘just posturing’ when they staged a hundred thousand troops on their border with Ukraine?”

“Come on!” Dr. Williams replied. “That was Russia. And besides, we all know what came of that.”

“That was Russia under control of a madman,” Dr. Kallas replied. “Do you really consider the sanity of the current US administration to be any different?”

“Of course not!” Dr Williams replied. “But...” Dr. Madson threw a stern glance in the direction of Drs Williams and Kallas. They promptly shut up.

And at that moment, waiters arrived with more food. And Dr. Williams’s love for food overtook his need to bicker. So, he shut up and started eating. I could tell Dr. Kallas would have liked to continue the ‘debate’. But he held his tongue in fear of Dr. Madson’s reprisal.

And then more food arrived. And more. Crispy Shredded Beef that was sweet and chewy, a really rather authentic Kung Pao Chicken with loads of Szechuan peppercorns and dried chilies, a delectable Mapo Tofu, a crispy seaweed accompaniment that was sweet and salty and crunchy, and plenty of fried rice and fried noodle dishes. Amazingly, we managed to polish most of the food off.

The evening continued with more drinks and more conversation about the political situation and the growing influence of what we termed the irrationalists. And as more anecdotes from forums and social media were shared, we started to realize that the Earth was becoming a

dangerous and unpredictable place to live in. We all started to fear for our own futures. And, in the backs of our minds, the future of our very species.

Our work on HEX continued. As did negotiations with the Eilanas. Eventually, when the negotiations started to involve details of our scientific cooperation, some of us were invited in to participate as consultants.

A draft resolution was eventually finalized and agreed upon. One of the "strong recommendations" included in the treaty proposed by the Eilanas was that we continue to limit our cooperation with them to only a small number of participants, and that we do not tell the public. This recommendation was based on their observations of our current societal problems. It was validating to learn that they also considered the irrationalists a societal problem.

Another interesting term in the final treaty was their promise to assist us in the creation of new technologies and instruct us accordingly on the application of those technologies. The wording in the final document insinuated the provision of schematics and designs for technologies related to not just QUERY, but computing, propulsion, energy, space, agriculture, fabrication, environment, and 'defensive technologies'. The clauses stated that designs and schematics would be provided after we'd developed a foundational understanding of the technologies involved and contained very strictly worded provisions explicitly forbidding the use of those technologies for private, personal, or national gain.

And after that, members of our team and a few other teams that had signed the more restrictive NDA were once again allowed to converse with the Eilanas. It had been a long wait.

Chapter 18 Intergalactic data transfer

“You might wonder, given the restriction of the speed of light, how one might initiate a data transfer protocol with an alien civilization millions of light years away,” Dr. Williams stated.

He was giving a presentation on a new system we’d been tasked with building. The request had come from our Eilanas counterparts. Dr. Williams was suitably excited, and his enthusiasm on this particular occasion was clearly evident.

“That answer is, of course, QUERY!” Dr. Williams inserted a short pause for dramatic effect.

“The solution which I, of course, hypothesized myself several years ago, is very elegant.”

“Here we go,” Dr. Kallas whispered. “Dr. ‘embodiment of modesty’ Williams.”

“In principle, the mechanism functions like one of those old dial-up modems,” he continued.

“But it uses light instead of sound. We point our QUERY device at a screen on their end, and they point their device at a screen on our end. Each screen displays encoded data - pixels turned on and off to represent ones and zeroes in binary and a computer hooked up to each QUERY device reads the encoded data and then replies by displaying encoded data on the local screen.”

“Although this method is somewhat slow in comparison to current terrestrial data transfer mechanisms, it avoids the multi-million-year lag time associated with radio signals travelling across light years’ of space,” he added.

“The Eilanas have provided us with all the relevant protocols and encodings necessary to implement our end of the messaging system,” Dr. Williams added. “We’ve agreed upon a spot in this lab where we’ll place our screen. I’ve marked it with tape over there.” He pointed to a spot on the ground in the corner of the lab. “I’ll provide you all with the specifications. And Dr. Stall has assigned us all with subtasks. Let’s see if we can’t get this thing up and running today!”

The task turned out to be rather trivial. We easily assembled everything needed during that workday and, after a few test runs and a bit of debugging, the whole system worked seamlessly. I recall the ‘noise’ flashing on the screen at our end was mesmerizing. After everything was working, I found myself staring at the monitor. Dr. Kallas, who happened to be passing by at the time stopped and asked if I could "see anything in the Matrix". He actually made me laugh on that occasion.

The transfer protocol was restricted, initially, to allow only a limited set of filetypes that enabled our partners to share scientific papers, tutorials, images, and video with us. Access to the computer on our receiving end was also carefully secured and restricted to a few select teams. Limited chat functionality was also added, allowing those of us with clearance to ask for clarifications and advice in a much more fluid and natural way. In simple terms, we had just established a chat forum with our Eilanas counterparts.

Within the first few months of the data transfer channel being open, we received thousands of papers, guides, and lessons covering numerous subject areas, including theoretical physics, astrophysics, applied physics, materials science, statistical mechanics, quantum cosmology, nonlinear sciences, mathematics, computer science, chemistry, biochemistry, and genetics.

We carefully and anonymously disseminated some of those materials to the greater scientific community. Those papers went on to precipitate innovations in many fields. Previously unsolvable theorems in mathematics and computer science were solved. Cures for previously incurable medical conditions were created. New materials with exotic properties were synthesized and studied. Composites that would enable the creation of structures we previously had no way of building, such as space elevators, were suddenly within reach. New methods of energy generation became a possibility. Projects for cleaning and reducing the levels of carbon dioxide in our atmosphere were initiated. New architectures and training methods for machine learning models were prototyped. The list just went on. And our stellar cartography project received an equally large boost on the receipt of data documenting the locations of thousands of unsurveyed galaxies and the stars within them.

Chapter 19 Beta

After setting up the communications channel, we started to learn a lot more about the Eilanas.

“It says here that the Eilanas home world is in a galaxy we’ve designated as ESO 146-5,” Dr. Kallas stated. “It is apparently one point four billion light years from here. And contains approximately thirty trillion stars. It is one of the most massive galaxies in the known universe.”

“For a long time, we assumed they must be located in the Needle galaxy,” Dr. Nara replied, “the place where we found those puzzles.”

“Yeah, according to what I’ve learned, the puzzles were placed on those planets by a group of Eilanas xenoanthropologists,” Dr. Madson stated. “Their reasons for choosing those planets had something to do with... what was it?”

“Long-term probabilistic analysis indicating a high chance of the formation of intelligent life,” Dr. Williams replied.

“Right, yeah, that was it” Dr. Madson replied. “Apparently, the puzzles were intended to be solved by future inhabitants of those worlds.”

“But then we came along and solved them anyways,” Dr. Williams replied. “Yes, I think we’ve all read that part of the report.” He sighed.

“You know what I found funny in that report?” Dr. Kallas replied.

“We don’t. But I’m sure you’re about to tell us,” Dr. Williams replied in a sarcastic manner. Dr. Madson turned and stared at him.

“The bit where they said we’d done free beta testing for them,” Dr. Kallas replied.

“I’d just like to remind you all that my hunch about those puzzles was always correct,” Dr. Williams bragged.

“Yes, Robert. You needn’t keep reminding us of that fact,” Dr. Kallas replied.

“Apparently Beta orbits a red dwarf star. The planet is larger than Earth. One point six three times, to be exact,” Dr. Madson stated.

“God. Imagine how long flights on that planet must take,” Dr. Nara replied.

“And it has higher gravity than Earth. Eleven point nine meters per second squared,” Dr. Kallas replied.

“Mental note. Don’t drop anything on your foot there,” Dr. Madson interjected.

“Fun fact,” Dr. Williams replied, “habitable planets of that size are much more common in the universe than the relatively small planet we’re living on. It is believed that Jupiter is the reason why our inner planets are smaller than they should be.”

“Beta’s land masses are divided into three main continents - two that span the planet's equator, and one that covers the planet's north pole. All three continents are inhabited,” Dr. Madson added. “The planet is host to over twenty billion Eilanas.”

“That’s more than twice the number of humans on Earth. It must be crowded,” Dr. Kallas replied.

“Remember that the planet is larger and thus has a lot more surface area,” Dr. Williams replied.

“Ahh but they have less land as a percent of surface area,” Dr. Kallas replied.

“Approximately eighty four percent of Beta is below sea level, as compared to about seventy one on Earth.”

“Apparently their population management is very efficient. According to this, almost all Eilanas reside in concentrated communities scattered around their planet, the population of which varies from twenty million in the smallest, to over one hundred million in the largest. Some of their population centers are underwater, on floating terrestrial platforms, and on orbital platforms in the vicinity of the planet,” Dr. Madson replied.

“They must have intense pollution problems,” Dr. Nara replied.

“It seems not,” Dr. Madson replied. “An estimated ninety six percent of the land on Beta is designated as natural wildlife sanctuary, where residence and visitation are strictly prohibited unless for research purposes.”

“Our own human population exploded in a relatively short amount of time,” Dr. Nara stated.

“If they’ve been around for hundreds of thousands of years longer than us, you’d think they’d have a larger population than that, especially since they claim to have indefinitely long lifespans.”

“Here it states that population on Beta is controlled via voluntary colonization missions. The policy was initiated when life expectancies rose to a sufficiently high level. The Eilanas reside on over one hundred different worlds, with a combined population of over two hundred billion,” Dr. Madson replied. “They’re also currently in the process of colonizing another thirty planets.”

“Two hundred billion,” Dr. Nara replied. “Wow!”

“It says here that the Eilanas have over three hundred different spoken languages and close to one thousand different cultures,” Dr. Williams replied. “Many of those were established in the distant past when their planet was divided into what we refer to as countries. Cultural heritage is preserved and forwarded through various programs run by a cultural imperative.”

“Cultural imperative,” Dr. Kallas replied. “Sounds very Vulcan.”

“Again with the Star Trek?” Dr. Williams whined.

“Due to their abundance of clean energy generation technologies, the Eilanas enjoy a post-scarcity society,” Dr. Madson added. “Food, shelter, and commodities are all provided for. Services such as cleaning, maintenance, construction, waste management, recycling, and transportation are fully automated. Thus, all professions can be categorized as either cultural or scientific.”

“A culture of only artists and scientists,” Dr. Nara replied. “Sounds like a utopia.”

“Yes. Apparently the Eilanas have the freedom to choose and change their careers at will. All work is performed on a purely voluntary basis, and all forms of work fall into either cultural or scientific vocations, aside from a small rotating contingent of voluntary civil servants who oversee public projects, policing, and judicial matters,” Dr. Madson replied. “The only formal governing bodies that exist in the Eilanas society are those that oversee their cultural and scientific organizations – The Cultural Council and The Scientific Committee.”

“Let me interrupt you before Riks makes yet another Star Trek joke,” Dr. Williams interjected.

“Sure! Did you have something you wanted to ask?” Dr. Madson replied.

“If they only have artists and scientists, how do they deal with defense? Surely they must have some form of military?” Dr. Williams asked.

“Ahh. Yes, I think I saw the answer to that somewhere. One sec...” Dr. Madson replied.

“Here it is. The Eilanas have no military of their own. They rely on automated defense systems and stealth technologies. But they do donate research and resources to a shared military collective established in their inter-race cooperative.”

“Okay, makes sense,” Dr. Williams replied.

“Interesting,” Dr. Kallas stated. “So, this alliance has pacifist races and militaristic races. These guys sound like the Asgard.”

“The what?” Dr. Williams replied.

“The Asgard?” Dr. Nara replied. “The grays from Stargate?”

“Yeah, them!” Dr. Kallas replied.

“I wonder if they’ll look like grays?” Dr. Nara asked.

“Oh, come on!” Dr. Williams replied. “They’re not going to look like grays! That science fiction trope has been beaten to death!”

“What makes you sure about that?” Dr. Kallas asked. “After all, plenty of documented extra-terrestrial encounters here on Earth have involved grays.”

“Documented. Encounters?!?” Dr. Williams fired back.

“You know that I’m talking about!” Dr. Kallas replied.

Dr. Madson stood up. “Guys, could you be civil for at least five minutes?”

The room fell silent for a moment. Drs. Kallas and Williams both had noticeably red faces despite the fact that they hadn’t been slapped. It was like Dr. Madson could slap their faces with her mind. We were all a bit scared.

Dr. Nara finally ended the uncomfortable moment. “I don’t know about the rest of you, but I’d like a one-way ticket to their home world. Preferably now.”

Chapter 20 The vanishing galaxy

Back in time immemorial, our very first research project with QUERY involved studying the nature of galactic changes over varying timescales. As part of that project, we created a system capable of predicting the movement of galaxies over time. After we were reassigned to other projects, new teams continued our work, and as the years passed and QUERY technologies improved, those algorithms were improved to not only predict galactic positions over longer timescales, but to predict the location, formation, and death of stars within those galaxies. The project’s goals were to ultimately identify and map all galaxies in the observable universe.

As nearby galaxies were mapped by long-range stellar cartographic efforts, those teams moved to mapping galaxies farther and farther away. A decade later, those same teams would start to examine distant galaxies such as those captured by the original Hubble Deep Field scans. And it was around the time we'd first contacted the Eilanas that something unexpected was discovered by one of those teams. An entire galaxy had seemingly vanished.

Several hypotheses were suggested as possible reasons for the disappearance. The most plausible was that our software predictions were wrong. However, the system had been improved so much that it was able to provide galactic location predictions with an accuracy of over 99.9997%. In all cases where predictions were inaccurate, the position had been off only slightly, and the galaxy was found by manually tuning parameters. A large section of

intergalactic void had been searched after the prediction of the location of the vanishing galaxy had failed, but nothing had been found.

The next hypothesis suggested that the galaxy had perhaps merged with another. However, the possibility of that occurrence was built into the prediction system, and none of the galaxies within the suggested path of the vanishing galaxy had shown signs of enlargement or a change of shape consistent with the collision of two galaxies. And so that hypothesis was ruled out.

The next theory suggested that the vanishing galaxy may have encountered a supermassive black hole of a size we'd yet to encounter, and that it had been consumed. QUERY was capable of detecting the presence of black holes due to radiation emitted from their accretion disks. We'd used it to study many black holes in detail, including the supermassive black hole at the center of our own galaxy. We'd yet to observe a black hole large enough to swallow a whole galaxy, but it was a plausible theory, and one that excited a great number of astrophysicists.

One final hypothesis suggested that the vanishing galaxy was actually in its predicted location, but some sort of QUERY jamming technology was preventing us from observing it. The only way to verify the idea would be to travel to that galaxy and observe it in person. That was clearly not an option. However, the idea that a species had developed technology capable of hiding an entire galaxy was rather interesting and perhaps a little worrying.

The mystery of the vanishing galaxy would, for now, make for a very interesting paper.

Chapter 21 An impromptu visit

It was an otherwise drab and rainy Wednesday morning in London. A seemingly ordinary day in a long string of ordinary days that had followed after the excitement of contact with the Eilanas had worn off and we'd returned to regular research. What we didn't know was that it would be a day we'd never forget. And, in all eventuality, the first day of the rest of our lives.

My colleagues and I were in my office – located off in a remote corner of our main lab – having our usual nine thirty stand-up meeting. We'd closed the door to avoid disturbances. To be perfectly honest, nine thirty was simply too early in the morning to be having a meeting of any value or contribution – caffeine levels were far too low and most of us didn't function as human beings until around eleven. I had been meaning to move the meeting but hadn't got around to it.

Each of the five of us were supposed to spend no longer than two minutes explaining what we'd been working on, and what we'd be doing next. It was Dr. Williams' turn. He was very verbose and always took more than his allotted two minutes, so we scheduled him to be last during the session, since he always managed to fill the remaining time. I recall that he was speaking enthusiastically, and at length about a breakthrough he'd made in automated resolution adjustment algorithms. At that crucial point during a meeting – the one where you zone out completely and start looking at your mobile – was when we suddenly found ourselves in a completely different place. It was a feeling similar to being abruptly awoken from deep sleep. There had been no forewarning of what was about to happen, and it took us more than a moment to realize we'd been teleported somewhere else.

Dr. Williams didn't even skip a beat. He clearly hadn't even noticed what had just happened, and continued to enthusiastically eschew his new theories, while pointing his finger to a whiteboard that was no longer next to him. It took a good ten or so seconds before he realized what had happened. I remember he glanced several times at the place where the whiteboard was supposed to be, and then panned his gaze around the room as the expression on his face morphed from the smug grin he usually assumed while presenting his theories to that of pure shock.

It is difficult to describe the feeling of utter surprise, disorientation, and disbelief one feels when one is instantaneously transported somewhere else. This is especially true the first time it happens. And doubly so when it happens without any prior forewarning. One moment I'd been stood in my office. The next I was in an environment so completely alien, I was having difficulty processing what I was seeing. What had just transpired took more than a moment to sink in. My first reaction was a mix of shock and panic. And as those feelings wore off, my brain scrambled to assess what had just happened. We'd known that our alien friends were going to visit us, but we didn't know when. In fact, my colleagues and I had been excitedly looking forward to their visit for many months. To be honest, we'd expected they'd give us some forewarning and then actually come down to visit our planet. But they had, as it seems, simply showed up unannounced and beamed us straight onto their ship.

As my state of shock subsided I noticed there were many other people around us, and in addition to those who had, moments prior, been in the meeting with me, I recognized others – a few UN delegation members I'd previously met, and researchers from other teams we'd been working with. A few people around us started screaming. Others started crying. A few people were hit by immediate and blinding disorientation. One of them, across the room from

us, vomited. And, from what I remember, at least two people almost passed out and had to be helped by those around them.

The actual process of being beamed up didn't feel like anything at all, which was quite surprising. It did, however, take a moment for most of us to refocus and adjust due to the sudden change in our surroundings. The room we'd been beamed into was slightly darker than our lab, and that change of lighting had caused me to squint for a moment. My ears popped due to the change in air pressure. After the initial disorientation faded, we glanced around at each other in disbelief.

The room we had all been beamed into was, as I remember, large, circular, unfurnished, and had no windows. The walls were white and glossy, as though they were made of plastic. They were adorned with horizontal inlaid ridges inscribed with various glowing blue glyphs that encircled the chamber. Our team immediately recognized some of the glyphs as being those we'd seen in the puzzles we'd recently worked on solving.

Despite being on what we would find out was a star ship, we weren't weightless. On the contrary, everything felt a little heavier, which would have been due to artificial gravity generation devices being set to, presumably, the gravity the aliens were accustomed to on their own planet.

After the realization of what had happened settled, my team and I started to talk amongst ourselves.

“Oh. My. God!” Dr. Nara exclaimed, excitedly. “This is fucking POG!”

“Pog?” Dr. Williams asked.

“It translates to ‘exciting’ in your ancient dialect,” Dr. Kallas replied.

“Noted,” Dr. Williams replied.

“So, Robert. You got beamed up,” Dr. Kallas stated. “I recall you didn’t ever want that to happen to you.”

“I didn’t,” Dr. Williams replied. “But, in retrospect, I didn’t feel a thing. It was surprisingly painless.”

“What did you expect it to feel like?” Dr. Madson asked.

“I thought there would be some pain associated with my previous body being vaporized,” Dr. Williams replied. “But perhaps those memories were left behind in my former self.”

“You’re assuming that the technology works by destroying the former you and, what, printing a new version of you in a new location?” Dr. Kallas asked.

“Yes. That is my logical deduction of how it would work,” Dr. Williams replied. “And besides, how else could it work?”

Nobody really wanted to answer Dr. Williams and go down that particular rabbit hole. So we all stayed silent. After a moment, conversation turned to a discussion of the ship we were on.

“So. We must be on one of their ships,” Dr. Madson stated.

“I’d assume so, yes,” Dr. Williams replied.

“There are no windows here. So, we can’t know for sure. But I’d have to imagine that’s where we are,” Dr. Kallas replied. “Logically we can’t possibly be anywhere on Earth.”

“Do you think we’re in Earth’s orbit?” Dr. Nara asked.

“You’d have to assume so,” Dr. Kallas stated. “Transporters have a limited range.”

“Transporters have a limited range,” said Dr. Williams, imitating Dr. Kallas in a childish voice. “What scientific rationale led you to that conclusion?”

“If I recall, you discounted the idea of transportation entirely the last time we spoke about it,” Dr. Kallas replied.

Dr. Williams realized that he had, indeed, stated words to that effect. And so, he stopped talking.

“If this ship is in Earth’s orbit, don’t you think it will be spotted by telescopes, satellites, stuff like that?” Dr. Madson asked.

“Don’t worry. Most of the people controlling our telescopes and satellites are in the loop about this,” Dr. Williams replied.

“But I remember at least one science fiction thing where a hobbyist astronomer saw something before anyone else did,” Dr. Madson replied. “This whole Eilanas thing is a guarded secret. Wouldn’t this just be inviting it to get out there?”

“They’re the ones who wanted it that way,” Dr. Williams stated. “I’m sure we’re parked outside the view of hobbyist astronomers,” he sighed.

“These ships are probably have cloaking devices,” Dr. Kallas stated.

“I wonder why the Eilanas weren’t here to greet us?” Dr. Nara asked.

“If our reaction is anything to go by, they probably intentionally stayed away to avoid being puked on,” Dr. Williams replied, nodding in the direction of the third person who’d lost their breakfast since we’d arrived.

“I expect they’ll show up eventually. Why just teleport us here if they’re not going to make contact?” Dr. Kallas stated.

And he was correct. Although we couldn't make out any doors in the room we were waiting in, an opening sort of appeared to one side of the room, and light streamed in as a much more well-lit corridor outside of our room was revealed. Shortly thereafter, two Eilanas entered.

This was our first time seeing Eilanas in the flesh. The two that arrived were a little taller than we'd expected – about human height, or roughly a meter and a half tall. They could perhaps be described as a lifeform evolved from something akin to the carnivora order on Earth – the line of organisms that gave rise to mongooses, weasels, cats, bears, hyenas, dogs, and even seals. However, our own point of reference was Earth's tree of life, which would, of course, not have been relevant to their planet's ecosystem. Unlike us bald humans, they were hairy. They had long tails, long pointed ears located higher up on their skulls, long incisors, and vertical slit pupils. Their hands were composed of three fingers and a thumb, and we later observed that they were able to use them in a very dexterous manner and could manipulate objects to a fine degree. They were very much thinner than the average human, even accounting for the fur.

Dr. Williams would eventually and humorously refer to them as "cat elves", although that wasn't perhaps the most apt description of what they looked like. We wondered if their slit pupils made him recognize them as feline in nature. Dr. Kallas thought they looked more canine-like because of the shape of their ears and faces. The disagreement between doctors Williams and Kallas on this issue would crop up over and over during the years to come. One thing was for sure, they didn't look at all human, and they certainly weren't evolved from any primate lineage. Most of our preconceptions – from science fiction television shows – about what advanced aliens might look like up until the moment we met the Eilanas were of humanoid species that had human-like faces, bodies, arms, hands, legs, and feet. Most of us were expecting them to look like grays. But the Eilanas were nothing like us and nothing like grays, not in the way they walked, not in the way they looked, not in their mannerisms and rituals, and not in the way they conducted themselves.

A few of the UN delegates who were amongst us screamed in fear as the aliens entered, and had to be calmed by nearby colleagues, who also looked quite shaken and apprehensive. I'm not quite sure why the arrival of the Eilanas elicited such a response from our colleagues. My team and I weren't the slightest bit scared. If anything, we wanted to get to know our hosts more, having talked extensively with them via our communications uplink.

"Not grays," Dr. Williams stated.

"Evidently not," Dr. Kallas replied.

"You owe me a tenner," Dr. Williams stated.

Shortly after their arrival, one of the Eilanas started to speak. They had some sort of device about them that translated their own vocalizations into English. We hypothesized that it was perhaps built into their suits. Despite the fact that the translation device was louder than their own speech, we could just about make out their language under its sound. It was, as they had described, nothing like any of our own spoken languages.

The most accurate description I can provide is that the language sounded like a series of variable length and variable pitch chirps and growls. Somewhat like a mixture of those online videos of cats 'talking' to each other and huskies making human-like vocalizations. Their language also seemed to include a variety of head gestures. One gesture, which we assumed was probably a whole word, involved a sort of sneeze-like fast exhale through the nose with

accompanying circular lurching motion of the head in a downward motion. It was fascinating to hear, and see, for the first time, a language spoken by an entirely alien species.

They informed us that we had been "translocated" to their ship, and that we were "welcome aboard". They introduced themselves as Kaisu and Reili and went on to explain that they were representatives of the Eilanas cultural council and that they'd like to take us on a short tour of their ship. After our own "cultural council" members had been calmed enough to comply, we followed them out into the corridor.

"These doors and ceilings are way larger than what I'd expect would be necessary to accommodate the size and shape of those Eilanas," Dr. Madson stated as we exited the room.

"This vessel is designed to facilitate relations with other species," Kaisu replied, "including bulkier lifeforms."

I'm not sure if that description of humans went down well with everyone. We'd learn later that there were far bulkier lifeforms out there and that we weren't the intended victim of that seemingly snide remark.

Our tour guides took us down a corridor and into another large circular room, slightly different to the one we'd been in – this one had a window. When I say window, I mean one whole wall looked like it was exposed to space. We made our way over to get a good look out. We could see the Earth, and, in close proximity, another alien ship.

“Interesting,” Dr. Kallas stated. “This doesn’t seem to be a physical window. Perhaps it is some sort of forcefield.”

“Forcefield?” Dr. Williams replied sarcastically. “Such a concept is scientifically implausible.”

“Look for yourself,” Dr. Kallas replied.

Dr. Williams examined the opening. “Perhaps this is just a very thin window made of materials we have yet to develop,” he posited.

“Well, if you’re so sure about your hypothesis, go ahead and touch it,” Dr. Kallas replied.

“Okay then!” Dr. Williams replied. He moved his hand quickly towards the ‘window’. His hand passed through it. Dr. Williams screamed in agony and pulled his hand back.

“See! I was right! Not a window!” Dr. Kallas replied.

Dr. Williams was in too much pain to answer Dr. Kallas’s snarky remark.

Kaisu strolled over to us and stated, “Don’t physically interact with the observation membrane.”

“You could have told us that earlier!” Dr. Williams exclaimed, holding his hand in pain.

Kaisu pulled out a small green transparent card and tapped on it. Dr. Williams stopped wincing almost immediately. The tips of his fingers, that had been red a moment before, looked normal again. Kaisu strolled away.

“Wait, what was that?” Dr. Williams asked.

Kaisu didn’t reply.

“Look! There’s another ship out there!” Dr. Madson stated.

“The other vessel belongs to the Science Committee,” Reili stated. “Some of you will be translocated across momentarily.”

Some of the translations made by their audio device were seemingly rather concise and worded in an interesting, and sometimes off-putting manner.

The ship we could see outside the window was comprised of four half-oblong sections arranged in a flattened "X" shape. The sections were free-floating and didn’t appear to be attached to any central structure. The outer hull of the ship was white, smooth, and plasticky looking. A few lights and blue and red glowing words made up of similar glyphs to the ones we’d been seeing throughout the ship adorned its exterior hull. We estimated each ship section to be perhaps a few hundred meters in length and one hundred meters at their widest point. We assumed the ship we were looking at was identical to the one we were on but couldn't really know for sure.

After that brief sightseeing stop, we were taken to what our hosts were calling the ship's "sustenance district". Some other Eilanas were present there, presumably eating lunch, or dinner, or breakfast, or whatever classification they had for the meal they were eating at that moment. One or two of them briefly turned to look at us, and then returned to their business of eating and chatting. One of our tour guides explained to us that "one may have sustenance synthesized from the modules located in the walls", while pointing at a series of rectangular devices built into one wall. The other explained that "the devices have been configured to synthesize pizza, burgers, fries, and all other popular and greasy human foods. Remember this location if you require more sustenance." After pausing to ask if any of us would like to try the apparatus, we proceeded to the next section of the ship.

Apparently, nobody was hungry, although Dr. Williams told us after we'd moved on that his blood sugar might have been a bit low, that he was getting a bit peckish, and that he should have, in retrospect, taken them up on their offer of a pizza. Dr. Madson told him to stop whining and reminded him that he'd eaten literally half an hour ago. Dr. Williams reminded Dr. Madson that it was just one croissant he'd eaten and that it barely constituted a "decent breakfast". I deduced that they were both clearly in need of more caffeine – something the aliens had failed to offer us.

Next stop was the habitation space. We were informed that we wouldn't be needing to stay on the ship because the journey would be short. Given how far the Eilanas home world was from Earth, we'd assumed the trip would take, at the very least, weeks. However, for our information, we were shown cabins where we could stay, if needed. Each cabin contained what our guides told us were "cleaning facilities" - they turned out to be a toilet and a shower.

The rooms were simple and spacious. Various control panels adorned the walls, but we didn't get a good look at them.

Last stop was a furnished room containing a large white table surrounded by chairs suitable for humans. Various smaller tables and seats dotted the edges of the room. This, as the guides explained, was a room assigned for "constructive debate". They went on to add "recreational activities can also be performed here". We weren't quite sure what to make of that phrase but chose to consider it harmless.

As abruptly as we'd been "translocated" to this ship, some of us were, without warning, "translocated" to the other ship. This time, it was to what Dr. Kallas was already calling the "observation lounge". Dr. Williams insisted the room be named the "viewing deck". Drs. Williams and Kallas argued over the point for a short while until Dr. Madson told them to "shut up and stop behaving like children". A few Eilanas were present when we arrived and greeted us in the same manner as the members of the cultural council did. And then, in an instant, the view from out of the window changed dramatically.

Chapter 22 Vedess

What we observed out of the viewport, just moments later, was that of a planet much different looking to Earth. We immediately deduced that it must be Beta. The ship we were on was in high orbit around the planet, and to one side, in the distance, we could see their host star. Although much smaller than the Sun, it appeared much larger than ours would if viewed from a ship orbiting Earth. Beta's orbit was much closer to its red dwarf host star. A

multitude of star ships, space stations, and orbital platforms, spanning out in all directions could be clearly observed from the window. It was a sight to behold.

Our new science committee hosts informed us that we'd arrived in orbit around Beta, and that we were to be split into groups to discuss research. A moment later, my team and I were once again "translocated" elsewhere.

"Ah come on!" Dr. Williams shrieked. "They could have at least given us some warning!"

"I get the feeling it's something we're going to have to get used to," Dr. Kallas posited.

"Oh god, it is, isn't it?" Dr. Williams replied.

The change from being in a rather dimly lit cabin on a starship to what appeared to be an outdoor setting made me and the others squint for a moment before we were able to focus on where we were.

"We seem to be in some sort of park. I'm assuming this is Beta," Dr. Kallas stated.

We were all stood on what appeared to be an outdoor grassy area. Under our feet was what we imagined was grass on this planet. It was, however, red in color. In fact, most of the plants in the area were orange or red in color.

Dr. Madson crouched down to examine the grass. "This appears to me some sort of moss," she stated.

“Don’t touch that!” Dr. Williams exclaimed.

“Why not?” Dr. Madson asked.

“It might be dangerous to us. Or it might cause irritation. Or an allergic reaction,” Dr.

Williams replied. “Talking of which, I’m starting to feel itchy. Oh god!”

“Do you really think the advanced aliens with starships and teleporters would lack the foresight to determine whether they were beaming us into a field full of deadly foliage?” Dr. Kallas asked.

“Okay, I concede that you might have a point there,” Dr. Williams replied. “Still, there could be any manner of bacteria, spores, or toxins in the air that are harmful to us. Not to mention the radiation from their star.”

Beta's star was low in the sky. It appeared visibly a lot larger than our own sun - perhaps ten times as large to the naked eye.

“Do you think it’s morning or evening?” Dr. Nara asked.

“Can’t tell,” Dr. Madson replied.

On further inspection, we realized we were standing on an elevated platform inside one of the domes we'd seen in some video footage the Eilanas had previously shown us of their home

world. We were, from our current position, able to observe many other platforms like the one we were standing on. Each platform was disc shaped, and they were arranged in vertical series, with upper platforms having smaller diameters than lower ones. Center-points of each disc were offset from those both above and below.

“We’re at quite an elevation here,” Dr. Nara stated. “What a view!”

“I don’t see any guard rails around the edge of this platform,” Dr. Madson stated. “I’m not going anywhere near the edge.”

“These seem to be the same structures we saw in their video,” Dr. Kallas stated. “And look, the top of the dome is just above us.”

It was true. Looking up we could see that the dome skimmed our position, just a few dozen meters above.

“I assumed the configuration of these structures is designed to allow light and precipitation to reach lower platforms,” Dr. Kallas posited.

“I wonder how they’re held up?” Dr. Madson wondered. “There’s no physical supporting column in the middle.”

“Oh, right. Interesting,” Dr. Williams stated. “I hadn’t noticed that. They must be using some sort of antigravity technology to keep these afloat.

“Possibly a similar technology to the one that generated gravity on their ship?” Dr. Kallas asked.

“I’d assume so, yes,” Dr. Williams replied.

“How high up do you think we are?” Dr. Madson asked with a slightly nervous tone.

“We appear to be on the top-most disc of one of these structures. If you estimate the distance between platforms and multiply that by the number we see on other structures around here, I’d say a few kilometers up,” Dr. Kallas stated.

“Shouldn’t it be cold and windy this far up?” Dr. Nara asked.

“Yes, we should be freezing,” Dr. Kallas replied. “That dome must regulate temperature.”

“Still, it is a little cold here,” Dr. Nara replied. We all nodded in agreement.

There were no buildings on our level – the whole thing was a garden consisting of trees, bushes, lawns, and flower beds. Stone pathways connected different areas.

“I wonder how we get down from here?” Dr. Madson asked, still uncomfortable about our elevation. “There don’t seem to be any stairs or elevators connecting the platforms.”

“The distance to the next level down clearly rules out jumping. And there’s nothing to climb on,” Dr. Kallas replied. “It looks like we’re stuck here.”

“Be logical, everyone. They probably use their teleporters to move between levels,” Dr. Williams stated.

There were plenty of interesting things to see, and some stunning views to take in. We walked around the grounds for a short while, observing the landscape in all directions. To one side of the city, we could see a large red-orange forest stretching inland, and in the far distance, a snow-capped mountain range. On the other side was the ocean. Half of the city was actually built into the sea. Since there was no barrier at the edge of the disc, we were reluctant to approach it too closely. However, Dr. Nara didn’t seem to mind. She walked all the way to the edge and peered over.

“Yep, we’re really high up,” she stated. “And I can see people, I mean Eilanas, on the platforms below us.”

“What are they doing?” Dr. Madson asked.

“It’s hard to tell from this distance,” Dr. Nara replied. “Gardening, maybe?”

“Okay, can we please get a bit farther away from the edge of this thing?” Dr. Madson said in a slightly panicked manner.

We returned to our beam-in location and, given we'd been on our feet for some time, decided to sit down on the moss while waiting for whatever happened next. A moment later our Eilanas host transported in. I had hoped to observe visual and auditory effects during the transportation process, but I was probably not paying attention when it happened. To me, the alien's arrival was instantaneous, and made no sound. Later both Drs. Kallas and Nara claimed to have seen a slight cracking in the air and heard a low metallic hum as she appeared.

"Hello," the Eilanas said. "I'm..."

There was a slight pause.

"I am Rosral," she said. There was another pause. "My name is Rosral." She appeared very nervous.

Rosral was quite a bit shorter than the Eilanas we'd met on the ship. She had brown-orange hair, with white patches around her nose, mouth, and neck. Her eyes were a very striking green color. She had very long and thin white pointed ears that protruded from either side of her head at about a forty-five-degree angle and pointed backwards slightly. She was wearing similar attire to the Eilanas we'd met on the ship – a black one-piece form-fitting and very high-tech looking suit with purple highlights on the waist, sleeves, and gloves. She was also wearing some sort of utility belt with many gadgets attached to it. We couldn't figure out what those gadgets were. Although we'd eventually go on to see other Eilanas wearing similar garb to what Rosral had on, it wasn't the most common clothing worn in Vedess by a

long shot. We hypothesized that it must be some sort of uniform worn by those in her profession.

“I am your host. Welcome to Vedess,” she said. She pulled a transparent green card from a small pouch attached to her belt. A holographic display formed above it. She interacted with the display for a moment and then put the card away again.

“I have been assigned to liaise with you, to answer your questions, to get you situated, and to tell you about our planet and Vedess,” she said. She still seemed very nervous.

“Relax, Rosral,” Dr. Madson said. “Take your time.”

Rosral nodded, pulled the green card out of her pouch, thought for a moment, and then put it away again. She took a deep breath. “You are?” she asked.

“I’m Rachel Madson. Pleased to meet you!” Dr. Madson extended her hand to Rosral, who looked at her hand and then her face and then her hand a few times in a confused manner. Dr. Madson kept her arm extended. Rosral finally reached out and they shook hands. “An Earth greeting,” Dr. Madson stated.

“Oh. We’re doing formal introductions?” Rosral asked. “I already know your names from the archive. Okay. Next.”

I stood up and followed along with the meet and greet. “John Stall,” I stated, offering my hand.

“John. Our archives state that John is one of many synonyms of the word toilet,” Rosral replied, while shaking my hand.

Dr. Kallas burst out laughing. “Dr. Toilet Stall!”

“Very funny,” I told Dr. Kallas. “I haven’t heard that one before.” The others started to giggle along with Dr. Kallas.

Rosral took a step back. “Have I caused offense?” she asked.

“No, no, not at all!” I replied. “We don’t use the word John as a synonym for toilet. Folks from across the pond do. You might want to ask Dr. Williams about that.”

“Do you all live around a pond?” Rosral asked.

I sighed. “Sorry about the metaphor. I’m from England. Across the pond refers to the place Dr. Williams is from. America. That’s where they all call their toilets John.”

“Firstly, I’m from Canada, not America,” Dr. Williams protested. “Big difference. Secondly, it’s the yanks who all call their toilets John.”

“And in our household, we all call our toilets Robert,” Dr. Kallas joked.

“Wha? Huh?!?” Dr. Williams exclaimed. “Oh. Ha. Ha,” he replied.

“Stop confusing Rosral!” Dr. Madson exclaimed. “Can we just get back to introductions, already?”

Drs. Williams, Kallas, and Nara all introduced themselves to Rosral. She started to get the hang of shaking our hands by the end of it all. I could tell that she saw no point to the ritual.

“What’s the local ritual for greeting people, I mean, Eilanas you’ve never met?” Dr. Nara asked.

“We always familiarize ourselves with the archives before making acquaintance,” Rosral replied. “We might have had some ancient ritual associated with such greetings, but it wouldn’t have been used for a very long time. I’ll be sure to familiarize myself with that part of our history and get back to you.”

“But what if you meet someone in a chance encounter?” Dr. Nara asked.

“I’m not sure what you mean,” Rosral answered. “The archives are always available.”

It was becoming evident that that particular line of conversation was going nowhere. We were clearly missing some crucial piece of information needed to make Dr. Nara’s line of inquiry understandable. Luckily, Dr. Madson had other questions and changed the topic of conversation.

“So, what’s Vedess?” Dr. Madson asked. “Is it your name for this planet? We all thought it was called Beta.”

“Vedess is the name given to this community hub,” Rosral replied. “Oh. Wait. The word city is how you designate such locations. I think.”

“Ahhhh. Okay!” Dr. Madson replied.

“Vedess is the main scientific research hub on Beta,” Rosral continued. “This is where you’ll be staying for the duration of your visit.”

“Duration of our visit?” Dr. Madson asked in a worried tone.

“Your visit is planned to last for...” Rosral paused for a moment. “...three Earth days.”

“Umm. Well. You see,” Dr. Madson replied, “I need to get home and feed my...” Dr. Madson’s voice quieted distinctly when she realized how the last word of her sentence might sound to our host. “...cat.”

“Feed your what?” Rosral asked.

We all exchanged glances. Had Rachel just offended the entire species?

“Umm. Cat?” Dr. Madson replied.

Rosral stared at Dr. Madson for a moment with a confused look on her face. She once again pulled the green card out from her pouch, briefly interacted with the holographic displayed that appeared to be showing pages of text in alien glyphs. She finally replied. "That will not be a problem."

"In what way will that not be a problem?" Dr. Madson replied in a confused manner.

"This is difficult to translate," Rosral replied. "We have slowed the progression of time in your solar system. Only a short amount of time will have passed on your planet when you return."

"A time dilation bubble?" Dr. Kallas asked, excitedly.

"Is that your name for the technology?" Rosral asked.

"No," Dr. Williams replied. "It's one of Dr. Kallas's Star Trek terms, no doubt."

"Stargate," Dr. Kallas replied. "It's a Stargate term. Remember? Those episodes with the Asgard and the replicators?"

"Okay, let's not confuse Rosral any further," Dr. Madson stated.

"No," Rosral replied. "I am familiar with those terms."

"You're familiar with Star Trek and Stargate?" Dr. Williams asked, bemused.

“As part of our training for this task we were given access to full archives on your species,” Rosral replied. “It is common for lesser developed species to use a lot of science fiction references in these situations. So, I studied those in detail.”

“Wait, you mean you watched those TV shows?” Dr. Kallas asked.

“Yes,” Rosral replied. “It was interesting to watch depictions of technologies from our ancient past.”

Ancient past. I recall those words clearly. If the Eilanas saw our science fiction as depictions of technologies from their ancient past, what wonders and advances were we about to encounter on their home world?

“So, you know the Asgard and the replicators?” Dr. Kallas asked excitedly.

“Yes,” Rosral replied.

“Hah! Did you know that Dr. Kallas here thought your race would look like the Asgard?” Dr Williams asked, with a grin on his face.

“How would I have known that?” Rosral replied.

“Sorry, human phraseology. I meant it as a statement,” Dr. Williams replied.

“In that case, no I did not,” Rosral replied. “However, there is a species in our alliance that resemble the Asgard. If I recall, they inhabit the galaxy where your planet is located.”

“The grays?” Dr. Kallas asked.

“Yes,” Rosral replied.

“Wait, there are grays. And they live in the Milky Way,” Dr. Kallas stated. “So, all this Area fifty one stuff might actually be true?”

“Oh, god,” Dr. Williams stated in an exacerbad manner. “Don’t get him started.”

Luckily for us, Dr. Nara had more questions. “Some of us were on another ship. Did they also come to Vedess?” Dr. Nara asked.

“Your diplomatic counterparts are now in Voriss,” Rosral answered. “Voriss is the cultural center of Beta.”

“Tell us more about Vedess and Voriss!” Dr. Nara stated.

“Vedess is located on one of this planet’s equatorial landmasses. Voriss is on our northern polar continent. Both Vedess and Voriss house close to one hundred million Eilanas, and on average, as many as five million visiting species.”

“One hundred million in this city alone?” Dr. Kallas exclaimed. “That’s, like, more than five times as many people as in Tokyo!”

“Eilanas,” Dr. Williams added. “Not people.”

Dr. Kallas corrected himself. “Eilanas. That’s going to take some getting used to.”

“Next we will go to the visitor’s center,” Rosral stated. Her nervousness had subsided slightly. “We have visitor centers in most cities. They are carefully configured to accommodate visiting species and include habitation blocks where you sleep and spend your leisure time.”

“Carefully configured?” Dr. Madson asked.

“Yes,” Rosral replied. “The dimensions of the rooms, doors, and beds are reconfigured for each visiting species. Also, the toilets and cleaning facilities.”

“Wait, so you rebuild the place every time new aliens come to visit?” Dr. Williams asked.

“Rebuild?” Rosral replied, obviously confused. “Oh. Sorry. We haven’t used that term in a long time. They aren’t built. I think your word would be something like fabricated or materialized.”

Drs. Kallas and Williams looked at each other with childlike grins on their faces. They were clearly very excited about the technologies we’d learn about during our stay.

“So, these structures with the disc-like platforms. What are they called?” Dr. Nara asked.

“The word is untranslatable in your language,” Rosral replied. “We call them Seris.”

“Seris,” Dr. Nara repeated. “What a pretty sounding name.”

“Before we depart, let me tell you about what you can see from here,” Rosral stated. “Follow me.” Rosral started towards the edge of the disc. We all followed. As we got within a few meters of the edge, Dr. Madson stopped and hung back from the group.

“Dr. Madson is afraid of heights,” Dr. Nara stated. “Perhaps we shouldn’t walk too close to the edge.”

Rosral gave us yet another confused look and then walked back to where Dr. Madson had stopped. “We can see everything relevant from here.” Rosral pointed at the orange forest in the distance. “That forest is called Dasn. It is one of thousands of wildlife reserves on Beta. In the distance are the Esal mountains.”

“Very picturesque!” Dr. Nara replied.

Rosral continued around the disc, making sure not to get too close to the edge. We stopped on the other side and looked out. “That is the Ardys ocean,” she stated. “For those of you who want to approach the edge, you’ll see that a portion of Vedess is built into the sea. Some of our city is under water. It is a relaxing place to visit.”

Dr. Nara and Dr. Kallas approached the edge and looked down. “Oh yeah! Wow!” Dr. Nara stated.

“I’ll take your word for it,” Dr. Madson replied.

Rosral continued around the circle, and we finally returned to our starting point. “Let us now go to the visitor’s center,” she said.

“I guess we’re going to find out how we get down from this platform,” Dr. Kallas said to Dr. Williams.

“Bet it involves teleportation,” Dr. Williams stated.

“And just think,” Dr. Kallas replied, “less than an hour ago you would have continued to poo-poo the very idea of transporter technology.”

“Yeah, but that was before I made a one point four billion light year journey in under one second,” Dr. Williams replied.

Dr. Madson, who was walking just ahead of us turned and gave the two an evil glance. And so, we continued on. This time with a bit of peace and quiet.

Rosral opened one of the pouches on her belt and produced a few blue transparent cards. They looked just like the one we’d seen her using a few times. Only they were blue and not

green. She handed one to each of us. The card had almost the same dimensions as a credit card, which I found quite handy since it fit neatly into my wallet alongside everything else.

“This device is a visitor’s guide, information source, and means of transportation,” Rosral stated. “To activate it, simply tap it twice like this.” We all tried. Holographic projections appeared above each card.

Dr. Williams brought his card close to his face and examined each side in detail.

“Fascinating,” he said. “I can’t see anything in here that resembles a projector or circuit boards. Or a battery.”

Rosral continued. “Interact with the holographic display using your fingers.” She demonstrated by clicking and swiping. We tried it too. Using the device felt much like using the interface on a smart phone or tablet, only you were interacting with air. She showed us how to bring up maps of Vedess, a searchable repository containing information relevant to our stay, and a guide to the planet of Beta. Rosral then explained how the transportation mechanism in the blue card worked and instructed us all to follow her lead. The transportation functionality allowed us to "translocate" to several different locations on the Seris. One by one we followed her instructions and were transported to a new location, nearer to ground level. Dr. Madson was relieved when we arrived.

The area we arrived at was an indoor section in the lowest most disk of the Seris. This was the visitor's center to which we had been assigned. We were in what appeared to be a large, circular, and very shiny white atrium. The walls appeared to be made of a similar plastic-looking material we had encountered on the star ship moments beforehand. We observed

many passageways leading off from the atrium, all of which were labelled with illuminated signs written in Eilanas glyphs.

Rosral looked around for a moment and realized there was a misconfiguration. “Sorry. One moment,” she said while fiddling with her own, green-colored card device. “These signs should be in your language.” A moment later, the signs changed into English language versions. We could now read that those passageways led to such areas as "habitation", "laboratories", and "constructive debate".

“This is where you will be staying,” Rosral informed us. “And where we will conduct seminars and discussion during your visit.”

“Can we presume that if we leave this area, the signs will not be in English?” Dr. Williams asked.

“Correct,” Rosral replied. “You can use the card device to translate them.” She showed us how that worked. She then asked us to follow her down the passage labelled "constructive debate".

We arrived in yet another large, circular, and shiny white chamber. Rosral stopped, interacted with her handheld device, and a large white elliptical table, surrounded by white chairs, of suitable size and shape for human use appeared in the middle of the room. She made her way over to one of the chairs that was different from the others. It appeared to be specially configured for her Eilanas physical traits. We all took seats around the table.

“I imagine this situation is confusing for you,” Rosral stated. She was correct in her assumption. The past hour or so had been overwhelming and beyond imagination. I’m sure the others shared that feeling.

“In this first session, I’d like to answer any questions you have,” Rosral stated.

Chapter 23 I'm an Eilanas scientist. AMA.

“Did we just travel one point four billion light years in a matter of seconds?” Dr. Kallas asked.

“No,” Rosral replied. “The journey happened instantaneously. No seconds elapsed.”

We looked at each other, stunned.

“Doesn’t it take an immense amount of energy to travel such a long distance?” Dr. Kallas asked.

“Here we go with the science fiction tropes again,” Dr. Williams snidely commented.

“Yes, it did require a significant amount of energy from your perspective,” Rosral replied, “but the amount of energy required to perform a jump isn’t related to the distance travelled.” Dr. Williams beamed a smile in Dr. Kallas’s direction. “It is proportional to the volume and mass of the object to be moved.”

“Not all of your science fiction is going to turn out to be science fact,” Dr. Williams told Dr. Kallas. He had no reply.

“I’m sure you’re going to have other assumptions that are based on your science fiction,” Rosral said. “I’m glad I studied it in such detail. Oh, and before you ask, the meaning to life, the universe, and everything is indeed forty two.”

Rosral’s joke made us all laugh. It was clear that she’d shed her nervousness after spending a little time with us.

“Quantum spacetime inference, or QUERY as you call it, is a natural accompaniment to jump travel,” she continued. “It allows the navigator to verify that the destination contains no solid objects.”

“I’m assuming solid objects at the destination would be bad?” Dr. Nara asked.

“Very bad,” Rosral replied.

Rosral had started to present as what we assumed was her true self. She was a very upbeat, energetic, and humorous host. She smiled a lot. At least we assumed it was a smile. She was always happy to take time to properly understand what we were asking her. Her own Eilanas voice was chirpy, and quite different to the Eilanas that had greeted us on the cultural council ship, almost like she had a different accent. It was reflected well in the synthesized voice that spoke her words in our own language.

“Were you the one we talked to during first contact?” Dr. Madson asked.

“First contact?” Rosral asked with a confused look on her face. “Oh. Wait. No, that wasn’t me. Those affairs are handled by members of the cultural council. I was training to be part of the team assigned to you during that time.”

“I ask because they also had a sense of humor. Is that a common thing in your culture?” Dr. Madson asked.

“I don’t know what you’re talking about,” Rosral replied in a rather deadpan manner. We weren’t quite sure if she was being humorous with her answer.

“What about warp drive?” Dr. Kallas asked.

“Warp drive,” Rosral replied. “The concept of expanding and contracting spacetime around a vessel to achieve faster-than-light propulsion. Yes, such propulsion mechanisms do exist. They’re not instantaneous like jump drive, but they do have application for travelling short distances, for propelling very large objects, and in some military and tactical areas. The caveat with such propulsion systems is that the entire flight path must be clear of objects, which is largely impractical.”

“My brother here is worried about dying from potentially harmful bacteria and organisms on your world. How have you ensured that we’re safe from those things?” Dr. Madson asked.

Dr. Williams opened his mouth as if to start a rebuttal to Dr. Madson's description of him.

But he decided not to bother after all.

"Prior to species contact we perform a study designed to identify all possible problems associated with their visiting our vessels and our planet," Rosral informed us. "We synthesized appropriate inoculations. They were administered upon your arrival on our ship."

"Are you sure about that? I never got any tablets or injections!" Dr. Williams exclaimed.

"Well, duh," Dr. Kallas replied. "They can, you know, beam them directly into your body without you even knowing."

"Ahh. Yes. Good point," Dr. Williams replied. "Just to be absolutely sure, Rosral, is that what happened?"

"Yes," she replied, narrowing her eyes slightly. "That's what happened." Dr. Williams let out a sigh of relief.

"Interesting," Dr. Nara stated. "I had a pretty bad sniffle earlier today, but it's gone now."

"Come to think of it, I've had a sharp pain in my knee for quite a few weeks. That's gone,"

Dr. Kallas replied.

"Did your inoculations include cures for other illnesses?" Dr. Madson asked.

“Our automatic medical systems fix health problems as soon as they are identified,” Rosral replied.

“Fix health problems?” Dr. Williams asked. “Like ALL health problems?”

“Yes,” Rosral replied.

“Everything?” Dr. Madson asked.

“Yes,” Rosral replied.

“Like cancer everything?” Dr. Nara asked.

“Yes,” Rosral replied. “Cancer falls under the set of everything.”

We all looked at each other in disbelief.

“That stylish suit you’re wearing, does it have any special meaning? Does it give you superpowers?” Dr. Nara asked.

“Superpowers? Do you mean special functionality?” Rosral asked.

“Yeah, sure, let’s go with that,” Dr. Nara replied.

“Yes, this suit is designed for use in inhospitable environments,” Rosral replied. She pressed a button near one of her shoulders and a covering neatly formed around her hands and face. And ears. She pressed the button again and the coverings melted away.

“Why are you wearing it here?” Dr. Nara asked.

“Why are you asking?” Rosral asked. “Does it not make me look stylish?”

“Talking of our first contact chat, they told us that we’d qualified for contact because we’d reached a certain level of technological advancement. These others think it is because of QUERY. But I don’t. Can you perhaps expand on this subject?” Dr. Williams asked.

“You are correct,” Rosral replied. “It wasn’t just based upon your invention of quantum spacetime inference. The technology you refer to as "QUERY" is something most other species develop a little later into their technological advancement. Your race got lucky with that invention. We initiated contact with your because you were getting close to creating some potentially catastrophe-causing technologies, including self-replicating artificial life, nanotechnology, and artificial general intelligence.”

Rosral continued. “But it was also because of your societal problems. Most races that develop dangerous technologies either go on to harnessing them, or they end up destroying themselves. However, your societal situation prevents us from accurately predicting an outcome.”

“So, wait. We’re a special case?” Dr. Williams asked.

“Yes,” Rosral replied. “We would have normally waited a lot longer before contacting a race at your level of advancement. We would have observed and waited to see if you came out at the other end.”

“Came out the other end?” Dr. Madson asked.

“That you come together as a species to harness technology for the betterment of everyone on the planet,” Rosral replied.

“Fat chance of that ever happening on Earth!” Dr. Nara replied. “Not as long as wealth is the only driving force on the planet.”

“We’ve observed many species that faced similar problems to your own go on to become utopian societies,” Rosral replied. “But we consider your political situation too unpredictable.”

“How so?” Dr. Williams asked.

“Perhaps an example will help explain our position. You have already added artificial intelligence into killer robots. Those robots are used by your military and police,” Rosral explained. “The most influential governments on your planet are starting to be overtaken by extremists. As such, those robots will soon be in the hands of those extremists. As will dangerous biotech and nanotech. And soon artificial general intelligence. Our prediction engines suggest that a devastating conflict is about to emerge on your planet. One in which

the most powerful nations will do anything to win. This will incentivize them to put artificial general intelligence into robots. Robots designed to repair other robots on the battlefield. Robots that will learn to build more robots. The system will likely self-improve exponentially and wipe out your entire species. We can either sit back and watch that happen and then clean up the resulting mess, or we can help you out and stop an artificial superintelligence from emerging. We chose the latter.”

“So, what you’re saying is that it’s very rare for a species to get to our point of technological advancement and have the entire world taken over by nazis at the same time?” Dr. Nara asked.

“Essentially, yes,” Rosral replied.

We had no words.

“This nazi trait that a large percentage of humans seem to have, is it something you’ve ever observed in other species?” Dr. Madson asked.

“Oh yes, it is quite common,” Rosral answered. “After studying your species and your current situation, I had to refer to the cultural archives for more information. We call this tendency authoritarian disposition. Normally speaking, roughly one third of the population of most species at your stage of development have an authoritarian mindset, meaning they prioritize conformity and homogeneity. They strongly support traditional values and anti-diversity ideologies. This demographic shuns complexity in favor of simple solutions. From

the perspective of your current situation, that means that they are easily lied to and cannot be easily reasoned with.”

“Sounds like the irrationalists,” Dr. Nara whispered.

Rosral continued. “Only fifty percent of this trait is inherited. The other fifty percent arises from a more base instinct in organisms – those in a community that naturally watch for threats. Inheritance in the case of your species is derived from parents teaching their children to shun diversity and to hate other humans. Even in the absence of inheritance, some members of society will still attain it. It is not possible to change the trait in those who already have it. As you have witnessed on your own planet, those who align with the authoritarian ideology will continue to do so regardless of whether they are reasoned with. And they will continue to uphold the trait even if other members of the group behave in a manner that causes them harm or hardship.”

“I can think of a certain voting public who fit that definition,” Dr. Williams mumbled.

Rosral continued. “Your present situation – social media, mass media owned by people with a political agenda, and a profit-driven mindset serves to amplify this trait. To put it succinctly, anger drives sales. These mechanisms are so deeply entrenched in your society that it would be almost impossible to rectify the situation without groundbreaking change. In cases like yours, the situation must work itself out one way or another, and it often takes a disaster or the discovery of a way out of your economic model to precipitate such systemic change.”

“The discovery of life elsewhere in the universe should have brought society together. But it didn’t. It drove it further apart,” Dr. Madson stated. “That was the sign we ignored.”

“Yeah, and that’s why we ended up keeping HEX and everything discovered after it a secret from the public,” Dr. Kallas replied.

“We were already screwed. We just didn’t know it,” Dr. Williams added.

“What does this all mean for us? For our planet? For the reasonable people amongst us?” Dr. Nara asked.

“Becoming advanced doesn't necessarily mean becoming pacifists,” Rosral replied. “Our cooperative embraces cultural variety. Some races in our alliance are aggressive and war-like. They are the ones who lead on military and strategic matters.”

“But I don’t see us as aggressive and war-like!” Dr. Nara exclaimed. “You chose us. We’re not the fascists. We embrace science and culture just as you do. The nazis on our own world have spoilt everything. And most of what they do is motivated by money.”

“I understand,” Rosral replied.

“Surely there’s something you can do about them?” Dr. Nara asked. “Beam them into space, perhaps?”

“Technically, anything is possible,” Rosral replied. “But I’m not the one you need to talk to about that.”

“Wait, so technically you, yourself, could rid our planet of those nazis?” Dr. Kallas asked.

“Of course,” Rosral replied. “It would be trivial.”

“But you’re not allowed to?” Dr. Madson asked.

“Correct,” Rosral replied. “Those issues are probably being discussed by your counterparts in Voriss.”

“Right.” Dr. Williams stated in a sarcastic manner.

“Are you in need of food?” Rosral asked.

Before anyone could reply, Dr. Williams offered his opinion. “I’m famished!”

“Me too,” Rosral replied. “I know of a good place to eat.”

We translocated to ground level using our blue cards and Rosral led us on a long walk through the streets that connected nearby Seris structures. Most of the ground level area outside of our facility was under the shadow of the lower level of Seris 8 – the one we were assigned to. We passed through that area, and then crossed a large park, finally arriving at the outskirts of Seris 12.

Chapter 24 Mikato market

As we approached Mikato market, the delicious smell of barbecued food made me realize just how hungry I was.

Mikato market consists of a series of small street food stalls lined up on either side of a wide, outdoor pedestrian thoroughfare. As we arrived, and before we entered the noisier part of the market, Rosral provided us with a brief history of the venture.

“Welcome to Mikato market!” Rosral exclaimed. She was clearly quite excited to be there, and to tell us something about it before we pushed into the bustling crowd.

“This market was first created as a cultural project over one thousand Beta years ago,” Rosral informed us. “The idea of that project was to recreate old Eilanas cooking traditions and to re-learn cooking techniques lost to time. Due to the invention of sustenance fabrication devices, most of us had stopped preparing our own food, relying instead on dishes fabricated by those devices.”

“Replicators. I knew it,” Dr. Kallas noted.

Rosral continued. She had to shout over the noise of the crowd. Her translator device somehow captured her raised voice and broadcast the respective English phrases in the same manner. “Although we were originally a predominantly carnivorous species, we adapted to an omnivorous diet, and eventually to a diet formed from wholly plant-based products designed to mimic the taste, texture, and protein content of our previous meat-based dishes. Over the

centuries, those dishes morphed into new dishes, which then morphed into new dishes, and, well, you get the picture. As a result, when fabrication was introduced, the dishes that had become popular and ubiquitous at that time were the ones the fabricators were programmed to create.”

“Interesting,” Dr. Nara noted. “That sounds like the path we’ve been taking.”

“Those plant-based burgers are almost indistinguishable from the real thing,” Dr. Kallas added.

“The researcher who started Mikato market hypothesized that we might use our fabrication devices to create the raw ingredients used in the cooking of ancient food, and thus recreate dishes that had been popular thousands of years ago. Her idea was embraced, and a few hundred members of the cultural council joined in learning how to prepare dishes that we cooked during the time before fabrication,” Rosral added, still shouting over the increasingly loud nearby ambience.

Rosral continued. “During the project’s trial period, several food stalls were set up here under Seris 12 due to its central location in Vedess. Before long the market quickly became extremely popular, attracting locals with the aromas of new and exciting cuisines. The project was such a success that it was not only continued but expanded upon. As time passed, the market grew to include not only the originally served ancient dishes, but new and exciting recipes invented by participating chefs. Many thousands of volunteers join the project each year, and enjoy preparing and serving food, both day and night. It is now a renowned tourist attraction.”

“Our cultural researchers determined that the success of this venture is related to the aromas associated with cooking, coupled with the joy of preparing food from scratch,” Rosral added.

“We lost both of those with fabrication. Their return excited a great many of us.”

“I hate cooking,” Dr. Nara stated. “Give me a fabricator any day of the week.”

“Actually, I quite like cooking,” Dr. Kallas replied. “Especially on the barbecue, in the summer. With some beer.”

“How long do you think this explanation is going to last?” Dr. Williams muttered. “I’m starving!”

Rosral continued. “Due to the ease at which anyone on Beta can visit the market, one must book a visit ahead of time. This is to ensure the area doesn’t become too overcrowded.

Waiting lists are long. Even though similar markets exist in other cities on our planet, Mikato market is still the most coveted eating spot on Beta.”

“Wait, what?” Dr. Williams exclaimed. “Do we get to eat here or not?”

“Nearby residents, including us, are exempt from the need for such reservation permits,”

Rosral replied. “You got lucky with your visitor’s center assignment,” she added.

“Oh, thank god,” Dr. Williams replied.

Rosral led us into the dense crowd and eventually suggested we stop at a particular stall to observe the food preparation process there. Upon our arrival, the Eilanas manning the stall greeted us in what looked like a cheerful manner. He didn't have a translator, and so we couldn't understand what he'd said.

To be honest, upon first meeting the Eilanas it was very difficult for us humans to tell their biological sexes apart by eye. Both biological males and females were similar in size and build, and fur patterns and length varied considerably across the population. The males and females both had voices that were very similar sounding. Their spoken names were also so different to ours that no inference could be made. However, I had managed to figure out one method that worked, at least, some of the time. It was based on their written names. Rosral and some of the other Eilanas we'd met so far carried name tags. Their written names always included a suffix glyph, and I had only identified two such suffixes. The stall we had arrived at was adorned with a large sign that contained, presumably, the name of the stall owner, and on that placard was the suffix glyph I had deduced was used by Eilanas identifying as male. Rosral introduced the chef as Jenrys and explained that he was making an ancient dish comprised of spiced skewered meat cooked over coals. The name of the dish was, according to Rosral, Heta.

Jenrys started the food preparation process by using a sustenance fabricator in his stall to materialize chunks of meat. Although it resembled chicken, it was obviously something entirely different. He then pushed about five pieces onto a skewer and dipped them into a receptacle containing a thick brown liquid. The skewer was then placed over coals on a barbecue. During the cooking process, Jenrys turned the skewers and occasionally dipped them back into the thick brown marinade.

The smell as the meat cooked was delicious. Once he had finished cooking the meat, he pushed it off the skewer and onto a dish. Rosral beckoned us to try it, and we each took a piece using some small sharpened wooden skewers available at the counter. The meat was amazing tasting. It was sweet and spicy. It slightly reminded me of like jerk chicken. Dr. Williams was very excited about the dish and wondered if there would be seconds. He then quietly confided in me that he'd been worried they'd be serving us "cat food" and that he was most relieved that hadn't been the case.

After we were done with our sampling of Heta, Jenrys filled some small vessels, similar to the size of espresso cups, with a thick brown liquid. It looked like coffee. We each took one of the cups.

"Jenrys told me to tell you: don't drink the residue," Rosral said.

"What do you mean by don't drink the residue?!?" Dr. Williams asked in a panicked tone.

"What's wrong with the residue?!? Is it toxic?"

"He's probably inferring that it won't taste good," I replied.

"How can you possibly know that?!?" Dr. Williams replied.

"Pipe down, Robert!" Dr. Madson yelled.

Given the cups resembled shot glasses, we all decided to take our drinks together. Rosral watched us clinking our cups together with a curious grin on her face. And then we drank the liquid.

The taste of the liquid can only be described as somewhere between Bovril and a rather rich and salty red wine reduction. It was nothing like coffee, and that came as quite a shock. The rest of the team had obviously assumed similar. Their reactions were priceless. I've never seen so many people spit their drinks out at once. Rosral looked shocked.

"Good god!" Dr. Williams exclaimed.

"Does anyone have water?" Dr. Nara asked, still spitting at the ground.

Dr. Madson produced a bottle of water from her backpack, and we passed it around.

"I suppose you'll not be worrying about drinking the residue?" Dr. Kallas asked.

"No. Not during my lifetime," Dr. Williams replied.

"That drink wasn't to your liking?" Rosral asked.

"Do you have any concept of what human food tastes like?" Dr. Williams asked angrily.

"Don't shout at Rosral!" Dr. Madson cried. "She wasn't to know!"

“I quite enjoyed it,” said Dr. Kallas.

“There’s no accounting for taste,” Dr. Williams replied.

“I mean, it didn’t taste bad,” Dr. Nara replied. “It just wasn’t at all what I was expecting.”

“While, yes, it would probably serve as a fine sauce for steak, I would shudder at the idea of drinking a whole glass of it,” Dr. Williams replied. “What was that ghastly stuff called?”

“Misi,” Rosral replied.

“Good. I’ll remember that,” Dr. Williams replied.

Rosral apprehensively dragged us to another food stall. She was clearly shaken by what had happened. We sampled a few other dishes, cautiously this time. They all turned out to be unique and absolutely delicious. The stalls continued along the street as far as the eye could see, and I estimated they must have gone on for kilometers. The market was very busy, with hundreds of Eilanas queuing for food and happily eating together. Some of the stalls had particularly long queues, and we noted that they might be worth a try later in the day.

We observed an interesting Eilanas cultural trait during our trip to Mikato market. On Earth we have many local rituals for greeting each other ranging from shaking hands, to bowing, to kissing each other’s cheeks. At Mikato market, we observed how some Eilanas greeted each other by brushing the sides of their faces together. Sometimes it was just one side, sometimes both. Occasionally we witnessed them doing it many times over. We assumed familiarity

may have play a part in whether they brushed up against each other once, multiple times, or at all. It was fascinating to watch. Dr. Williams was a little perplexed by the fact that, when we'd asked Rosral about the Eilanas equivalent of shaking hands, she hadn't told us about this ritual. Dr. Nara offered an explanation – Rosral had been nervous at the time and probably hadn't understood our question well enough.

Chapter 25 Seminars

After lunch, we returned to Seris 8 and reconvened for our second session of the day. It was to be the first of a series of seminars intended to introduce us to technologies that the Eilanas could help us develop in the short term – two to five years. The first seminar was focused on power generation mechanisms. Rosral opened the session by materializing onto the table before us what she referred to as a power generation cell. The object was about the size of a shoe, matte black in color, roughly cylindrical in shape, and had many hemispherical protrusions on its surface. She recommended we examine the device. It weighed a lot less than we'd imagined, especially considering the slightly higher gravity on Beta.

“This is a standard power cell used in all of our high-energy applications,” Rosral explained.

“High-energy applications?” Dr. Nara asked.

“Powering the fields that maintain Seris platforms, city infrastructure, star ships and the like,” Rosral replied.

“How many of these are required to power a Seris platform?” Dr. Kallas asked.

“Just one,” Rosral replied. “Actually, one per platform is overkill. One of these could power the whole Seris.”

“We have no idea how much energy is required to power those floating mechanisms. In terms we’re familiar with, much energy can one of these things generate?” Dr. Kallas asked.

“One of these is roughly equivalent to all of your power generation on one continent,” Rosral stated.

We glanced around at each other, amazed.

“So, how does this power cell work?” Dr. Williams asked.

“In your equivalent terms, these are rechargeable batteries,” Rosral stated. “They both store and release energy.”

“So, they have to be charged?” Dr. Kallas asked.

“Yes,” Rosral replied. “The power cell charges itself.”

“How?” Dr. Williams asked, his eyes wide with surprise.

“Via the conversion of latent dark energy,” Rosral replied.

“Dark energy and dark matter are just theoretical concepts to us,” Dr. Kallas stated. “We use those concepts to to make various theories, such as the mass of galaxies, work.”

“What Dr. Kallas just said,” Dr. Williams added. “We have no way of observing or interacting with dark matter or energy.”

“Yes, we’re aware of that,” Rosral replied. “We’ll teach you how to do that.”

Drs. Williams and Kallas smiled at each other in excitement.

“Our first dark energy power generation devices were much larger than this one,” Rosral admitted. “But this technology will provide you with a way out of your reliance on steam engines.”

“Steam engines?” Dr. Williams laughed. “What an apt description!”

Up until that point in our history, a majority of energy generation mechanisms we'd relied on were based on either windmills, water mills, or steam engines. Fossil fuel and nuclear plants heat water, which turns into steam, which is then used to spin turbines and generate electricity. Decades of research had been poured into the next generation of power production - nuclear fusion - that was predicted would provide us with clean, cheap energy on a scale we'd never imagined. However, at that time, nuclear fusion power plants were still not a reality. And even those were basically steam engines. The device on the table in front of us could produce more energy than an entire continent's worth of our current power stations, and thus it had the potential to revolutionize power generation on Earth. However, it also had the

potential to cause a massive shift in the global economy, which could easily lead to all manner of undesirable outcomes.

“Do you use different power generation mechanisms for lower energy applications?” Dr. Kallas asked. “Things like our mobile phones.”

“Or these cards,” Dr. Williams added, holding his blue card up.

“I am showing you this device since it is large and thus easy to dissect and study. Smaller, lower power versions of this device are indeed used in the applications you’re asking about,” Rosral replied.

“Really? There’s one of those in this card?” Dr. Williams asked in a slightly confused manner.

“Yes,” Rosral replied. “It is very small, but if you look carefully, you’ll find it in one corner.”

I examined my own blue card and found a tiny black dot close to one of the corners.

“Well I’ll be damned!” Dr. Williams exclaimed.

Rosral spent the following three hours presenting holographic cross-sectional representations of the device in front of us and explaining the scientific principles that made the device work. She also explained, on a high level, some of the materials science advancements that had been required to create their first versions of these devices. Even though the topics Rosral

covered were high-level in nature, they were thoroughly beyond our current scientific understanding, almost to the point of feeling like science fiction. This first seminar had been so fascinating and mind-opening that we were eager to attend the next ones.

Chapter 26 An evening on Beta

After the seminar concluded, Rosral offered to take us back to Mikato market for dinner. Although most of us had put the rather unfortunate Misi experience behind us, Dr. Williams still seemed a little apprehensive about the visit. We anyway politely agreed, and she led us out of the visitor's center and across the park. By what would have been considered evening our time, Beta's sun had risen just slightly to a position that we might have considered mid-morning.

“A whole day would have passed on Earth,” Dr. Madson stated. “And look at where the Sun is now.”

“How long was a day on this planet again?” Dr. Nara asked.

“Five point one Earth days,” Rosral replied. “And a year on this planet lasts roughly eighty eight Earth days.”

“It’s still chilly out,” Dr. Kallas noted. Despite Vedess being in Beta's tropical zone, outside temperatures were on the cold side - about 18C by our estimations.

“Is the temperature inside this dome somehow regulated?” Dr. Madson asked.

“Temperatures inside this dome match those outside at ground-level,” Rosral replied. “At higher elevations, such as the one we visited when you arrived, temperatures are regulated to match those below.”

“So, it’s always cold here?” Dr. Kallas asked.

“Beta’s larger oceans and larger size are one reason for lower surface temperatures,” Rosral replied. “Another reason is due to a low greenhouse effect. Beta has a great deal of vegetation and sea-based carbon dioxide consuming life. Due to short seasons, Beta’s icecaps are also much larger and more stable than Earth’s, reflecting a great deal of radiation back into space.”

“You’re lucky,” Rosral added. “It’s almost constantly cloudy here. And it rains almost all the time. You’re witnessing a rare opportunity to see our star in the sky.”

“Rains almost constantly,” Dr. Williams noted. “Sounds familiar.”

“You’re not missing London, then?” Dr. Madson asked.

“Nope!” Dr. Williams replied.

“What season are we in?” Dr. Nara asked.

“Umm. We don’t use the concept of seasons here. But in Earth-equivalent, it would be early summer right now,” Rosral replied.

“Does it get even colder during the winter?” Dr. Kallas asked.

“Yes,” Rosral replied. “It can snow here during the winter.”

“What, even at the equator?” Dr. Nara asked.

“Yes,” Rosral replied.

Mikato market was just as busy as during our previous visit.

“Is it always like this?” Dr. Kallas asked.

“No,” Rosral replied. “It gets a lot more crowded at night.”

“Really?!?” Dr. Kallas exclaimed.

“Don’t worry, Riks. Night isn’t for another two days. We’ll be gone by then,” Dr. Williams replied.

“How do Eilanas eating habits work, given your long days and nights?” Dr. Madson asked.

“We get hungry every four or five hours like you do,” Rosral replied. “We just have more breakfasts, lunches, and dinners in one day.”

“More than the number of breakfasts, lunches, and dinners Dr. Williams eats?” Dr. Nara asked. Rosral gave her a thoroughly confused glance.

“Wha? Look! I get hypoglycemic if my blood sugar gets too low!” Dr. Williams replied.

“No need to answer that, Rosral,” I said. “We were just making a joke at Dr. Williams’s expense.”

“Yes,” Rosral replied. “I’ve noticed you do that a lot.”

“See! Even the alien can see how you all treat me!” Dr. Williams exclaimed. We all laughed.

“So, what about sleeping patterns?” Dr. Madson inquired.

“That’s where our species differ significantly,” Rosral answered. “Your species tends to sleep through your short night. Eilanas take naps when they’re needed. Our naps usually last about four Earth hours. We take them roughly every eight Earth hours.”

“You must be sleepy then?” Dr. Nara asked.

“A bit. I’ll sleep after we’ve eaten,” Rosral replied.

“How do you schedule work and collaboration around your sleep schedules?” Dr. Kallas asked.

“I’m not sure I’ve ever thought about how that works,” Rosral replied. “If a colleague is asleep, we just wait until they wake up.”

We pushed through the crowds and finally arrived at a stall. A spicy and exotic aroma not dissimilar to Indian food greeted us.

“I could smell this one earlier,” Dr. Kallas stated. “I’m glad we came here.”

“This is one of my favorites,” Rosral stated. “The dish is called Arel.”

The dish consisted of a thick red sauce made from local fruits, vegetables, and spices. The stall owner served each of us a portion in a small wooden bowl. A crispy, deep-fried bread was also provided. We followed Rosral’s lead, tearing off pieces of the bread and dipping them in the gravy. The sauce itself was slightly sweeter than curries we’d had on Earth and left distinctive notes reminiscent of cardamom and anise on the palette. The bread, though, was out of this world. Literally. It was the best accompaniment to a curry that I’ve ever tasted.

“What’s this bread called?” I asked.

“Rilno,” Rosral replied.

“I need the recipe!” I stated.

“You’ll find it in the archive,” Rosral replied. “But you won’t have the ingredients required to cook it on Earth.”

“Ahh, yes, of course!” I replied. “This probably uses special local flours and spices.”

“Even the oil it is cooked in contributes to the flavor,” Rosral replied. “You won’t find that on Earth, either.”

Following dinner, we returned to Seris 8, where we were ferried to one of the rooms in the "laboratories" section.

“I’ve left you with some evening recreational activities,” Rosral stated. She yawned. It was amusing to observe how wide their species could open their mouths. Her long incisors were very visible during the yawn. It was almost like looking at a cat yawn. Almost cute looking.

“Here are some quantum spacetime inference devices,” she said. “I’ve left coordinates to some locations of interest on Beta that you can explore.” She pulled out her green card and interacted with its holographic interface. A long table materialized. Followed by some food on plates, several bottles containing liquids, and some glasses. “Here are some snacks and a sample of local beverages. Stay as long as you like. When you’re tired, you know where your rooms are. I’ll see you in your morning.”

And with that, Rosral left for her nap. She looked exhausted. I was, too. And it was only early-evening.

“Ooh! What are these?” Dr. Nara said excitedly and she picked up and looked over several of the bottles sitting on the table. Dr. Madson joined her.

“This one looks like bubbly,” Dr. Madson stated, holding up a clear glass bottle containing a slightly yellow clear liquid. Bubbles were indeed visible in the liquid.

“Let’s give it a try,” Dr. Nara stated.

“For science,” Dr. Madson added.

Dr. Madson removed the cork. The liquid fizzed up slightly. She poured herself and Dr. Nara a glass. They both cautiously sniffed at the liquid.

“Smells like wine,” Dr. Madson said.

They clinked their glasses together and took a sip.

“Oh!” exclaimed Dr. Nara, taking another slightly larger sip. “Divine!”

“What are you guys doing?!?” Dr. Williams exclaimed, running over to the table. “Do you have any idea what’s in those drinks?”

“Bubbly,” Dr. Madson replied, finishing her glass.

“Ooh, it has quite a kick to it!” Dr. Nara exclaimed.

“Oh yeah! I can feel that too!” Dr. Madson replied. “Another?”

Dr. Nara didn't need to be asked twice. She held out her glass and received a refill within seconds. Dr. Williams watched agasp.

"I wonder what this stuff is called?" Dr. Nara said.

"The label on this bottle is in Eilanas," Dr. Madson stated, while examining it.

"Hang on," Dr. Kallas said. "We can use the translation thingy on it." He produced his blue card and scrolled through a few holographic menus. "Ah, here it is." He activated a menu item and held the card in front of the bottle. "The largest set of glyphs on this label translate to the word Sec. Perhaps that's its name?"

"Could be the name of the manufacturing company," I replied.

"Do they even have companies here? I mean, post-scarcity and all that," Dr. Kallas replied.

"I dunno. If I had a brewery here, I'd give it a name," I replied.

"Yeah, but don't they just replicate all this stuff?" Dr. Kallas asked.

"I suppose there had to be a brewery or winery making this stuff before they had replicators," I replied.

Drs. Nara and Madson were, by this point, on their third refill. “Before you empty that bottle, let me try some,” I said. Dr. Madson grabbed a glass and poured some in. The drink was nice and dry, and tasted quite similar to sparkling wine, but without the slightly yeasty taste that accompanies our own wines. It was very refreshing.

“Me too!” Dr Kallas said, holding out a glass.

“You’re all certifiable, drinking that stuff” Dr. Williams stated as he walked away. “It’ll be your own funeral.”

Dr. Kallas picked up a clear glass bottle containing blue liquid and held it up to the light. “I wonder what this stuff is?” he said.

After the initial excitement regarding the drinks Rosral had left us subsided, we moved over to the QUERY consoles she’d provided. We, of course, brought our drinks with us.

Following instructions left by Rosral, we used the consoles to remotely view the locations of interest she’d marked.

Of interest were the Arctic and Antarctic regions of Beta. Due to the more stable ice caps, biodiversity in those regions were much more varied than Earth's, and host to a complex food chain. Although we saw nothing like the penguins, seals, or polar bears, we observed a host of mammals and birds, a few of which were somewhat analogous to our own. Viewing the scenery of the northern continent, which we learned was called Vileona, made us a little jealous of our cultural counterparts who were staying in that region. The mountains and frozen lakes were particularly eye-catching, even when viewed remotely. Talking of which,

the holography presented by the Eilanas equivalent of our QUERY system was extremely detailed and presented visualizations with so much more clarity than our clunky systems at home. We all agreed that we really wanted one. Or a dozen.

We turned the QUERY viewer to other locations that Rosral had recommended. The next one was in the ocean between the continent we were on and the northern continent. In this new view we were able to observe massive sea leviathans that reminded us of illustrations of some water-borne dinosaur varieties that once lived on Earth. The creatures were, according to the data, very much larger than the largest whales on Earth. Beta's larger size and expansive oceans were apparently host to an amazingly diverse biosystem.

The third location suggested by Rosral was that of a jungle on the Eastern continent. According to an electronic guide made available to us, ocean currents and weather patterns on the planet allowed for tropical climates in parts of the eastern continent. The jungles there had been untouched for millennia and were host to a diverse range of organisms, many of which resembled insects. Some of those insects were rather large, and I made a mental note to politely refuse any sort of jungle safari, if one were ever offered.

It had been a long day, and after polishing off several different bottles of alcoholic beverages, we decided to retire to our designated living quarters for the "night".

The rooms assigned to us are worth describing. Many different control consoles adorned the walls, all of which thankfully presented options in English. Each room contained a sustenance fabricator, with accompanying pre-sets for a large variety of Earth foods and drinks. A control console on another wall allowed for fine-tuned selection and adjustment of

sleeping arrangements, including a variety of different types of beds and bedclothing. Near the bed were controls for in-room temperature, humidity, and light intensity.

Another console was located above an alcove similar looking to the sustenance fabricator, but slightly larger. Upon reading that console, I realized it was designed to fabricate clothing. The console itself displayed an accurate representation of me, and various clothing options could be cycled through via available menus. The options available were very reminiscent of clothing I'd seen Eilanas wearing. One option allowed me to leave my existing clothing in the alcove and have it "purified". I wasn't sure what that meant, but I tried it out anyway. My clothes were instantly returned to me neatly folded and cleaned. Upon further inspection I found them to be in what could only be described as brand new condition. One of my pockets had been wearing thin, but the device had presumably restored the material to full working order.

Yet another console brought up holographic access to the same information available on our handheld devices, and more - what one might describe as access to the Eilanas internet. I noticed it was possible to tune into various local television broadcasts, and although I couldn't understand the language, there were plenty of fascinating looking programs available. I recall that I ended many of my evenings on Beta settling down to flip through various channels before calling it a night.

Of equal note was the room labeled "cleaning facilities". The Eilanas hadn't provided us with a toothbrush or toothpaste, but there was a console on the wall labelled as "oral purification". Further notes on the console's readout stated that it provided "nanomolecular dental purification, reconstitution, and refreshment". Activating the console materialized a small

bottle of mouthwash that tasted somewhat minty and not dissimilar to the mouthwashes I'd used back on Earth. However, its effects were much more pronounced - it removed tartar, regrew the enamel lost to chips and cavities, and left my teeth cleaner and whiter than any brushing might have accomplished. It actually did what was promised on the label, unlike Earth-based dental products. I strongly considered materializing additional bottles to take back to Earth with me. After a long, exhausting, and, frankly, bizarre day, I was very much ready for sleep.

Chapter 27 On the nature of hangovers

Our time on Beta had been nothing short of extraordinary. And it had only lasted one Earth day, or one fifth of a day on Beta. We would eventually learn a lot more about life on Beta, Eilanas society, and their amazing culture.

We all got a good eight hours of sleep after our first “day” on Beta. A combination of a busy day and plenty of alcoholic beverages meant that I dropped off almost immediately as my head hit the pillow. I recall feeling healthy and reinvigorated when I woke up, which was most odd. I was already at the age where having more than two drinks in the evening meant a guaranteed hangover the next morning. Most likely some Eilanas magic was at play, and I noted that I should ask Rosral about it the next time I saw her.

Upon arrival at my room the previous evening, I had noticed that there were no windows. This, I assumed, was on purpose – to allow us to sleep though daytime hours on Beta as though it were night on Earth. After getting out of bed, I used the “cleaning facilities”. The shower was wonderful. It somehow heat-adjusted automatically for me and the water

pressure was beyond anything I'd experienced before. I used the miracle mouthwash again, and it was every bit as good as I had remembered the previous evening. I put on my newly cleaned and repaired clothes and milled about the room for a while, examining the other consoles on the wall. I found one that was labelled "transparency" and tried it. It activated several "windows" around the room. Light flooded in, and the automatic room lighting adjusted accordingly.

Outside, the sky was filled with ominous black clouds. It was raining heavily. Rosral had mentioned that rainy days were more common than sunny days in Vedess. If we could have seen their sun, it would have probably been high in the sky at that point. The view outside of my room was to a garden area located on of the outer ring of the Seris platform.

Seris 8 was located right in the middle of what we'd found out was a district called "Kerni". Seris structures were positioned hexagonally, and so our own Seris neighbored six others, each of which had six of their own neighbors. Seris structures adjacent to the edge of the dome were shorter, to account for its curvature, and were considered more choice neighborhoods, since their residents were afforded wonderful views of the natural world outside the dome. Residences on higher levels were also desirable because of their views out across the nearby forest or ocean – views we'd seen when we first arrived. Our own living quarters were on the first level of Seris 8, and so the view past the garden area of our disc was mostly obscured by other nearby Seris structures. However, the bottom most disc, being the widest, gave us a larger garden, and our proximity to ground level allowed us to hear the bustle and goings on below.

I had a little time to kill before meeting the others and so fabricated myself a cup of black tea to drink while passing the time. Scanning the wall further, I found a control that opened a door to the garden area. Technically it didn't open a door – it dematerialized a section of the wall suitable for walking through. This dematerialization reminded me exactly of how the door appeared in the room we were beamed to on their star ship. The sound of the rain got a lot louder as the door opened, and I walked outside. The garden area just outside of my room was sheltered by the canopy of the above Seris platform. As I left my room, a chair and small round table materialized on the grass nearby. I sat down, drank my tea, and watched the rain fall. I caught the delicious smell of barbecued food wafting over from Mikato market. I started to feel very hungry.

A moment or two after I'd sat down with my tea, a large and very colorful bird swooped down and landed in the garden a dozen or so meters away from me. It strutted around and pecked at the ground a bit, not noticing my presence. I stayed very still so as not to alarm it. Two more similar looking birds joined it. I watched with interest. I deduced that the falling rain must have been forcing worms to the surface of the lawn, providing them with snacks.

Eventually one of the birds stopped what it was doing and stared me directly in the eye for a few seconds. It then let out a series of loud squawks. The other two birds immediately stopped and turned to face me. The birds were very large – much larger even than seagulls – and with much wider bills. At this point the way they were behaving seemed every bit as threatening as a seagull guarding its young. All three birds squawked relentlessly and started strutting towards me. One of them had some gunk hanging out of its beak.

I wasn't sure what to do but decided that the safest option was probably to continue to remain completely still and hope they'd soon lose interest. They continued towards me for what was probably at most ten seconds. But it felt like minutes. Thankfully, they eventually stopped and went back to minding their own businesses and pecking at the lawn. I crept quietly back inside, closed the door, and breathed a sigh of relief. That was not the peaceful morning cup of tea I'd had in mind. I couldn't fathom how much worse it would have been if I'd had a hangover.

Roughly fifteen minutes after The Bird Attack, I used the blue card Rosral had issued me to translocate to a spot designated as our meeting point. Dr. Madson was already there milling around, waiting for everyone else.

"You're up early too, I see," I said.

"Yeah," Dr. Madson replied.

"Nice rooms!" I said.

"Comfy beds, too!" she replied.

"Oh yeah. Definitely," I replied. There was a brief pause in the conversation while I tried to think of something to say. Which I couldn't. And so, on to the weather.

"Look at this rain!"

“Good that we’re sheltered from it here!” Dr. Madson replied.

“Did you try that mouthwash stuff?” I asked.

“Oh my god, yes!” she replied. “Where has that stuff been all my life?”

“I know! Right?” I replied. I knew that Drs. Madson and Nara had consumed a considerable amount of alcohol the previous evening. I wasn’t entirely sure if my lack of hangover could be attributed to one of those lucky occasions, or if there was some sort of anti-hangover field in our dome. And, as such, I wasn’t sure if to approach the situation with Dr. Madson. It didn’t look like she was suffering. So, I figured what the hell. “Did you notice the lack of...”

“Hangover?” she replied. “Yes! What is that?”

“Oh, thank God. So, it wasn’t just me!” I replied. What a relief.

“Do you think they just, like, beam it out of us or something?” she asked.

“I have no idea. I’m just thankful it exists. If it does. Which I’m starting to think...” I stated.

“Imagine if we had that back home!” she replied.

“I’d probably be penniless already,” I joked. We laughed.

“Did you get out into your garden?” I asked?

“Garden? No. I don’t think my place has one. All the walls were solid. No windows or anything,” she replied.

“Ahh. There are separate controls for the windows. And one to open a door to the gardens,” I told her.

“Really?” she replied. “You’ll have to show me them when we’re there next.”

“I can do that, yes,” I replied.

“So, there’s a garden. Is it nice?” she asked.

“Very nice, yes,” I said. “You can smell the cooking at Mikato market from there. And see out to some of the other Serises. I enjoyed a cup of tea there until I was almost attacked by some local wildlife.”

“Attacked? By what?!?” she asked, startled.

“A group of birds. Very large birds. Dinosaurs. Almost. It was quite frightening,” I replied.

“Sounds like it must have been,” she replied. “Perhaps I don’t need you to show me those room controls...”

At that moment, Dr. Nara materialized near us.

“Hi Kano!” Dr. Madson shouted.

“Heya!” Dr. Nara replied. “Oh. Good to see I’m not late!”

Just moments later, Drs. Kallas and Williams arrived. Followed by Rosral.

“Am I fashionably late?” Rosral asked.

“No. We arrived seconds ago,” Dr. Williams stated.

“Way to spoil a witty comment!” Dr. Nara remarked.

“Time to get some breakfast!” Rosral stated, cheerily. “I’ll take you to one of my favorite places to eat. Follow me!”

“We’re walking across that park?” Dr. Nara asked.

“Of course!” Rosral replied. “A straight line between two points is the shortest path.”

“But we have no umbrellas. We’ll get soaked!” Dr. Nara protested.

“No, we won’t!” Rosral replied.

As we made our way out from under the shelter of Seris 8 and into the rain, I had no idea how or why I wasn't getting wet. It was as though some sort of protective bubble had formed around each of us, dematerializing any drop of water that entered our vicinities whether it be falling from the sky or splashing up from the ground. It took us a good ten minutes to cross the park, and at the rate at which the rain was falling, we should have been soaked through after just a few seconds.

"Wow, this is cool! How are we not getting wet?" Dr. Nara asked.

"Those cards I gave you provide the anti-wet functionality," Rosral explained.

"I wonder what else these cards can do?" Dr. Kallas said.

"I'm sure there's a technical way of finding that out," Dr. Williams replied.

The restaurant we finally arrived at had only outdoor seated areas. However, it was shielded from the rain with its own anti-wet bubble. The restaurant itself was empty. There were a few vacant tables surrounded by chairs suitable for Eilanas physiology. Those would have been rather uncomfortable for human use. Rosral interacted with a small panel on a wall and an appropriate set of furniture materialized. We all sat down. Apparently, the restaurant was fully automated. Small holographic consoles appeared in front of each of us, providing menus of various foods, all of which we were unfamiliar with. Rosral explained to us that the selections presented were common breakfast foods in Vedess and made a few recommendations for dishes that we might enjoy.

I recall trying a dish that resembled a traditional Japanese breakfast – a bowl of something similar to rice, topped with a fishy tasting protein, sweet sauce, and some red vegetables that tasted vaguely oniony. My colleagues sampled a range of options. Dr. Williams wasn't all that picky with food but ended up going with something that resembled a croissant. He ate it very quickly, told us how delicious it was, with his mouth full, and then ordered a second one. And probably a third, although I didn't notice. Dr. Nara chose something that looked very much like eggs with a creamy sauce. Dr Kallas and Dr. Madson both opted for a dish that resembled a thai curry, with some flat bread as an accompaniment. Apparently, it was very fragrant and delicious, and the bread reminded them of crispy roti. I made a note to try that on our next visit.

“Hey, Kano, did you wake up with any kind of hangover?” Dr. Madson asked.

“No! Not even the slightest of headaches!” Dr. Nara replied.

“Me neither!” Dr. Kallas added.

“Yeah, John noticed the same thing. We were talking about it before you arrived at the meeting point,” Dr. Madson replied.

“How amazing is that?” Dr. Nara stated.

“Yeah! I know!” Dr. Kallas replied.

“Well, I didn’t have a hangover because I didn’t join you all in emptying those eight bottles,” Dr. Williams interjected.

“You missed out!” Dr. Madson stated. “And look! No repercussions!”

“I was wondering if there’s some sort of anti-hangover field in this dome,” I stated.

“An anti-hangover field? That would be almost literally one of the best inventions ever!” Dr. Nara replied.

“Let me get this straight. We learned yesterday that the Eilanas have an instant and non-invasive cure for cancer and you lot are all heralding an anti-hangover field as one of the greatest inventions of all-time?” Dr. Williams replied.

“Um. Yeah!” Dr. Nara replied.

“Well, you have to admit,” Dr. Kallas remarked, “hangovers are a much more prevalent affliction when compared to other ailments.”

“Perhaps for you lot!” Dr. Williams exclaimed. “Is literally everyone around me a lush?”

“I remember you enjoying a pint or ten not too long ago,” Dr. Kallas replied.

“I was much younger in those days,” Dr. Williams replied.

“Can’t take your drink anymore?” Dr. Madson remarked. “Have you become a lightweight?”

Dr. Williams grumbled under his breath.

I glanced over at Rosral, who appeared to be smirking at our conversation.

During breakfast, Rosral reiterated her promise that the following two days in Vedess were scheduled to be filled with seminars covering the principles of fabrication, advanced computing technologies, environmental stabilization, and, of course, quantum spacetime inference. We conversed about the many amazing things we’d experienced on the planet so far. Life on Beta seemed to be quite laid-back compared to Earth life. Rosral was in no hurry to get going, and so we chatted together long after we’d finished eating.

When we were finally done with breakfast, we got up from the table and, as we were walking away, it dematerialized along with the empty cups and plates on it.

Chapter 28 Seminars, day two

We returned to the visitor’s center and reassembled in the conference room. Rosral then treated us to a seminar on fabrication where we learned how combining limitless clean energy with devices able to convert energy into matter would one day bring about our own version of the Eilanas post-scarcity society. I must admit that some of what was covered went over my head even though it was presented as "the basics" by Rosral. Regardless, we all had a lot of

questions, and learned more than we had imagined possible. We were eager to get the materials presented to other members of our project.

The rain had eased up after our morning seminar, and we visited Mikato market, yet again, for lunch. Rosral directed us to a stall further into the market. It served a cold dish that was apparently very healthy and tasty. The dish, which consisted of slimy red vegetable shoots coated with a subtly fragrant sauce, was served in small white bowls. Although not all that appetizing to look at, it was indeed most delicious. Rosral explained that it was made from a variety of plants that grow in the nearby sea. After her explanation I recall thinking that it had tasted somewhat similar to wakame salad. Although the portion was small, the dish was very filling. Even Dr. Williams didn't ask for a second portion, although we could tell that this particular dish wasn't perhaps completely to his liking.

Following lunch, we reconvened for an afternoon seminar on compute substrate. Rosral started the seminar with a brief overview of their own compute substrate.

“Unlike your two-dimensional silicon wafer-based chips and printed circuit boards, our compute substrate is both three dimensional in design and holographic in nature,” Rosral stated. “It is not based on silicon transistors, either.”

Rosral materialized a small cube of their compute substrate onto the table. The cube measured about three centimeters on all sides and resembled a smooth piece of stone to the touch. It felt very dense and heavy, almost like a solid block of stone.

“This small cube of our compute substrate represents approximately all of the processing and data storage capacity available on your entire planet.”

“What sort of power requirements would a piece of substrate like this have?” Dr. Kallas asked.

“Approximately two thousand milliwatts in your measurements,” Rosral replied.

“That’s, what, about the same power requirements as the processors in our mobile phones,” Dr. Williams stated. “Do they generate heat?”

“No,” Rosral replied.

“Wow. Imagine how much more AI research we could do with even one of these!” Dr. Nara stated. “The limiting factor is energy, and the damage large amounts of energy usage has on the environment.”

“I’m assuming a miniaturized version of this is present in these cards?” Dr. Williams asked while carefully examining his blue card.

“Yes,” Rosral replied. “Not one. Many. Distributed throughout the card. You won’t be able to see them at normal magnification.”

“Speaking of which, you informed us that these cards were responsible for the anti-wet effect we experienced a few moments ago. Are there other things they can do?” Dr. Williams asked.

“Oh, yes. Many things,” Rosral replied. “For instance, your card contains the technology responsible for translocation.”

“It does? I always thought it merely interfaced with some translocation device elsewhere,” Dr. Williams replied. “Fascinating.”

“The card can also be used to materialize objects,” Rosral replied. “I used mine to create the tables and chairs here. And at the place we ate at this morning. And to create the food and drinks you had last night.”

“Wow! Can I keep mine?” Dr. Nara asked.

“I don’t see why not,” Rosral replied.

“You mean, I can take it back to Earth with me?” Dr. Nara asked.

“Of course,” Rosral replied.

“But aren’t you worried that we might lose it and it’ll be found by some evil rogue government?” Dr. Nara asked.

“Or that we’ll try to reverse engineer it?” Dr. Kallas asked.

“If you want to try to reverse engineer it, go ahead,” Rosral replied. “We’re teaching you fundamentals that will enable you to eventually create these yourselves. But it’ll take time. And I guarantee you won’t be able to reverse engineer these cards. No, I’d be worried about you losing it and one of those extremists on your planet finding it and making a big deal out of it on Fox News.”

“Fair point,” Dr. Williams replied. “Let’s all be careful not to lose these under any circumstances.”

“Don’t worry,” Rosral said. “Each card is coded to its owner. If you lose it, anyone finding it will not be able to activate it.”

“So, it’ll just look like a transparent piece of plastic?” Dr. Madson asked.

“Basically, yeah.” Rosral replied.

Rosral’s seminar on advanced compute substrate continued with a presentation of their history of computing, and the different technologies they used along the way. And it turned out they had also started with transistors and silicon wafers, just like us. The topic was fascinating. The entire seminar lasted about three hours.

During our seminars, Rosral would fabricate a delicious, slightly minty herbal tea for us to drink. We observed that Rosral, and indeed, most Eilanas consumed the tea almost constantly, at all times of the day. She explained to us that the tea, which was called “Oress”, caused a calming effect in Eilanas. Although it was warm and delicious, I didn’t note it

causing any physiological calming effect on myself. Dr Williams humorously called it “space catnip”. Dr. Kallas wholeheartedly opposed that designation.

Chapter 29 An evening in Voriss

Following our afternoon seminar, we were all expecting to be marched down to Mikato market, as per usual. However, Rosral informed us that we’d be dining elsewhere. She had scheduled us a trip to Voriss, the cultural capital of Beta. As was usual with Rosral, we were translocated to a new location without any warning. We’d started to get used to sudden translocations and abrupt changes in scenery. Well, most of us.

Voriss was very different looking to Vedess. Being situated on the continent located on their northern pole, it was built amongst the mountains, glaciers, icebergs, and snowpack of the region. In fact, Voriss was itself built into the side of a very tall mountain and was positioned many kilometers above sea level. We were beamed onto a very large circular platform jutting out from the mountainside. It was clearly an outdoor area.

“Welcome to Voriss,” Rosral exclaimed, “located on the northern continent of Vileona.”

The view from where we were standing was spectacular. Mountain peaks about us were adorned with thick and very smooth, blue-colored glacial waterfalls.

“The location for this city was chosen for its amazing scenic views and natural beauty,”

Rosral continued. “While this would not be considered either a logical or natural location to

build a city, we had the luxury of building Vooris where it is just because we had the technology to do so.”

“Our current elevation is about eighteen of your kilometers above sea level.”

“Wait, did you say eighteen kilometers above sea level?” Dr. Kallas asked.

“Yes, eighteen,” Rosral replied. “Eighteen point one to be precise.”

“That’s almost the height of Olympus Mons on Mars. The tallest mountain in our solar system. Or roughly two and a half times higher than Mount Everest,” Dr. Kallas stated.

“This is one of the smaller mountains in the region,” Rosral replied.

“Do you guys even understand the implications of where we are?” Dr. Kallas asked.

“Yeah. We’re on a mountain,” Dr. Williams replied in a sarcastic manner.

Rosral, after only a day and a bit with our team, had started to gain a second sense regarding impending rifts between Drs. Kallas and Williams. She continued her speech, so as to stop their bickering. “As you can see, Voriss has a dome similar to the one in Vedess. In fact, it has the same exact diameter. However, it is configured to maintain air pressure similar to sea-level and temperatures well above those outside of the dome.”

“How cold is it out there?” Dr. Madson asked.

“In Earth measurements, it can reach as low as minus seventy Celsius,” Rosral replied.

“Usually, snowfall passes through the dome’s membrane and turns into rain,” Rosral stated.

“However, today we’re experiencing a storm, which is driving snow against the dome so fast that the water on the inside is rapidly freezing into ice and causing snow to pack against the membrane itself.”

Rosral pointed to a spot on the dome where the phenomenon could be observed. Snow had formed a white shell on the dome’s outer surface, Chunks of the shell occasionally slid down the dome’s outer membrane.

Since Voriss was built into the mountain, we were able to observe that the dome encapsulating the city was not a dome, but a bubble. Taking in the view, we immediately noticed the lack of Seris structures that adorned the Vedess skyline. Voriss had a much different skyline – most of its structures were built into the mountain and they spiraled around its sharp peak. Walkways, kilometers in length connected various structures together. Of course, we assumed that these walkways were infrequently used given that the Eilanas tended to translocate elsewhere if the distance was great enough. However, the views from those walkways must have been fantastic, and we assumed they must be a popular tourist attraction. We wondered if they’d perhaps show us those sights on this trip, or maybe another.

At the top of the mountain, close to the dome’s apex, was a palace-like structure. Given this was the cultural center of Beta, we wondered if it might be a museum, university, concert

hall, or even place of worship. Whatever it was, it was impressively large, and we estimated it must have been significantly taller than Earth's largest skyscrapers.

Rosral gave us a moment to take in the view before informing us that we'd be going inside to look around a bit. We followed her across the large stone courtyard and into a nearby indoors area. Architecture in Voriss was markedly different to what we'd seen in Vedess. Unlike the glossy white interiors of the visitor's center and surrounding areas, the floors, walls, and ceilings in this structure were made up of what resembled a granite-like stone. The lighting was dim and ceilings were very high, presenting a feeling not unlike being in a large cathedral on Earth.

We followed Rosral across an immense chamber and through a spacious stone passageway that led us to another, even larger circular chamber. The smooth stone walls of the chamber rose vertically on all sides, eventually capping off in a dome at least a hundred meters above us. The circular chamber itself must have been a few hundred meters in diameter. We noticed alcoves around the edges of the chamber that served as eating and marketplace areas. Glyphs that we weren't familiar with adorned the semi-circular entrances to each alcove. It seemed that eating spaces (I recognized some glyphs related to food) were mostly lit with candles, providing a relaxing and somewhat medieval ambience.

To the far end of the chamber was a larger alcove where we could see beings materialize and dematerialize every now and then. We assumed the area must have contained some sort of mass-translocation device. Rosral directed us forward and through the center of the chamber. We had to push our way through the crowd to reach the far alcove, and it took quite some time to get there. When we finally arrived and were all standing on the translocation pad,

Rosral activated some nearby controls and we found ourselves in what we presumed was the palace at the top of the mountain.

“This is Vorisal, the main cultural center of Voriss,” Rosral announced. “It houses academies, museums, entertainment centers, concert halls, and research facilities.”

“This place is truly massive!” Dr. Madson proclaimed.

“Yes, it takes months to explore all the museums in the building,” Rosral noted, “let alone the other facilities. We don’t have time for that today. However, I wanted to show you the main atrium. It is a very popular tourist attraction.”

The main atrium of Vorisal absolutely dwarfed the chamber we’d just been in. It must have been over a kilometer in diameter, and we couldn’t even see the ceiling. Six impressively large stone statues adorned the main atrium. They were hundreds of meters tall by all accounts.

“These are statues of some of our ancient cultural pioneers, known for their music, writing, painting, and sculpture,” Rosral stated.

The atrium walls that rose vertically for hundreds of meters on all sides and were adorned with similar looking alcoves to the ones we’d seen in the previous chamber. However, these alcoves weren’t just on ground level. They dotted the walls all the way up as far as we could see.

“Each of the alcoves you can see contain a concert hall, museum, academy, library, or other such cultural facility,” Rosral told us.

From where we stood, we could count hundreds or perhaps even thousands of them.

“More than one million Eilanas work in this facility on a regular basis,” she continued.

The scale of the architecture was truly astonishing. We walked around the atrium and used our handheld devices to read the translations of inscriptions next to each statue. From reading the inscriptions, we deduced that the Eilanas depicted in the sculptures were likely the equivalents of our own famous ancient cultural icons such as Shakespeare, Michelangelo, Beethoven, and Mozart. Walking the circle around the interior of the atrium where the sculptures were housed took over an hour, and we had all built up quite an appetite once we were done. Rosral noticed that we looked hungry and exhausted and suggested that it was now time to go eat. We all wholeheartedly agreed. We proceeded back to the translocation pad and beamed down to the lower chamber.

Rosral guided us to one of the empty alcoves at the side of the chamber and informed us we were at our destination. As usual, she summoned up suitable furnishings – a table and chairs – and we took our seats. Unlike the plasticky white furnishings we’d become accustomed to in Vedess, these ones were made of dark, heavy wood to match the local décor. The alcove was very cozy and was lit with candles that were placed inside small holes on the walls. The smell of food from other alcoves was delectable, and we were ravenous by the time we sat down.

“The southernmost part of this continent is host to large forests, and an abundance of regional ingredients including fungi, berries, and wild herbs,” Rosral said. “Shortly after we colonized this area, the cultural council sent expeditions to the region to forage for ingredients and create new dishes suitable for us to eat. Those recipes were preserved over the generations. Although most of us prefer to eat more modern cuisine, visiting this place and sampling these ancient recipes is a popular tourist activity. We’ll be sampling some of those dishes this evening. They look a little like Earth cuisine to me, so you needn’t worry about being fed something not to your taste.”

We all stared at Dr. picky Williams.

Rosral materialized drinks for everyone.

“This is Simi, a local specialty,” Rosral informed us.

The drink, which was served very cold and in small shot-sized vessels, was a clear liquid with a rather high alcohol content.

“Robert, you’ll be drinking this with us,” Dr. Madson said, looking at him sternly.

“Alright, alright,” he replied.

“You’ll be happy to hear that your Earth tradition of raising your glasses and shouting a word out is also a tradition in this region,” Rosral stated. “Instead of cheers, residents of these parts say kanin.”

Rosral raised her glass and we all followed her lead. Even the hesitant Dr. Williams.

“Kanin!” she shouted. We did the same.

Simi reminded us of vodka, although it went down a lot easier. It was surprisingly good. I would have normally worried about starting the evening with such a strong drink but given the anti-hangover technology we’d experienced that morning we all felt a little easier about consuming it without abandon. Rosral materialized a second round shortly thereafter, along with some local bread, and the shouts of kanin continued.

Voriss gave us the opportunity to experience Eilanas public toilets for the first time. So far, we’d only been using facilities at the human-configured visitor’s center. All the toilets there resembled standard Earth seated affairs. Quite some time had passed since I’d previously relieved myself, and so during the early moments of the meal I snuck off to visit the facilities. Or, more accurately, the “cleaning facilities” as they were called. They were, thankfully, easy enough to find, based on directions provided by Rosral.

Upon arrival I found a very large room containing many very large stalls. Much larger than the ones we were used to on Earth. Inside one of the vacant stalls I found a small toilet that was presumably configured for Eilanas use. It roughly resembled squat toilets that I’d encountered in certain parts of Asia. After a quick look around, I found a console on the wall that appeared to enable the user to reconfigure it in several different ways – presumably for different visiting lifeforms. I recognized the Eilanas glyphs for “reconfigure”, since they appeared on the consoles in my room that allowed my sleeping arrangements to be adjusted. The console displayed all reconfiguration options in pictorial format. I scrolled through and

very quickly found our familiar seated variety. The system must have scanned my physical form and offered the option by default. Out of interest, I shuffled through other options, finding a variety of weird and wonderful toilets that came in many different shapes and sizes. I figured Dr. Kallas would love this experience, what with his fondness for Toilet TV. I made a mental note to tell him when I got back to the table.

Upon choosing the human option, the toilet instantly reconfigured itself for use. A toilet paper dispenser also handily materialized nearby. The toilet bowl contained no water, however, once I was finished with business, the deposited contents simply vanished silently, presumably via some sort of translocation mechanism. Sort of like an airplane toilet but without the deafening noise.

The cleaning facilities room itself was very hygienic and clean and there was a pleasant fragrance in the air that reminded me of freshly cut grass. During the experience I went on to wonder how much of Eilanas society might differ from what I was familiar with on Earth. I'd never visited an Eilanas home and wondered if perhaps their beds were the same as or different to ours, if they used couches or armchairs, what sort of décor they enjoyed, did they have a shower or a bath or both, did they have a sauna, what sorts of things did they do for recreation, did they spend time watching their holographic TV, did they enjoy swimming or going to the beach. The list went on. I realized I had a lot to talk to Rosral about.

The restaurant we were at had similar self-service functionality to the café we'd visited that morning. However, instead of us choosing from a holographic menu, Rosral controlled the flow of food from for us. She kept the pace of the meal slow and provided us with drinks as needed. I recall being more than tipsy by the end of the third course, which was probably

after our seventh or eighth kanin proclamation. The dimly lit environment around us was cozy and warm feeling, making the entire experience comforting, like an evening out on a dark and snowy winter's day. All we were missing was a roaring fireplace.

I vividly recall our fourth course was a sampling of local mushrooms, served in a variety of ways –pickled, seared, as a paste that was wrapped in some sort of fresh leaf, and as a creamy sauce with deep fried crispy things for dipping. The dish was simply exquisite. My memory started to blur shortly after eating the dish, and I attributed it to the amount of alcohol we'd consumed. I must admit this was possibly the most enjoyable evening we'd had on Beta so far.

As the evening proceeded, chatter on our table slowly increased in volume on a scale linearly proportional to the number of drinks that had been consumed. After Rosral had served our last course, the volume would have been noticeable for anyone passing within dozens of meters of our alcove. I vaguely recall Drs. Williams and Kallas conducting heated debates on a variety of subjects including whether the Eilanas were cats or dogs, strange TV shows they'd seen on local channels, how useful translocation would be if we could use it on Earth, and whether there might be a limit to the amount of food one could fabricate using the in-room food replicator. I seem to remember Dr. Madson had tried, repeatedly, to get the men to quieten down, had eventually given up, and had then started to complain to Dr. Nara about the public toilets. Apparently, she'd been a little too tipsy to notice the in-stall reconfiguration console and had thus ended up squatting – something she was entirely unhappy about. I sort of remember trying to ask Rosral questions about regular Eilanas life, but the others were just so loud that we weren't able to have any form of fruitful discussion. I also vaguely recall other beings moving about the large chamber adjacent to our alcove glancing in as they

passed, presumably to catch a glimpse of the life forms that were making so much noise.

Despite the blurriness of the situation, I do believe I was aware of the fact that we were making a bit of a scene.

And if I remember correctly, Rosral didn't seem at all bothered about what was going on. In fact, it seemed as though she was deriving a certain amount of humor and pleasure from observing us in an increasingly drunken state. Or perhaps she was simply too drunk herself to care.

My last memories of the evening are of us leaving the alcove and Rosral taking us on a walking tour. I don't remember where, but I do remember that Dr. Williams and Dr. Kallas had continued with their loud and scintillating discussions. And I think Dr. Kallas had even started singing at some point. Honestly, though, those memories are so blurry they could well have been part of whatever strange dreams I had that night.

Chapter 30 Seminars, day 3

Although I had woken up in my cabin in Vedess, I had no recollection of how I got there.

I did, however, quickly discover that the anti-hangover tech had worked once again. It is, of course, important to test these things rigorously. And from what I did, or more accurately didn't recall of the previous evening, I concluded that my second test of the technology had resulted in complete success.

I followed my usual daily morning ritual that ended with me enjoying a peaceful cup of tea in the garden. I wasn't interrupted by any angry birds on that occasion and enjoyed the fact that the rain had blown over and Beta's sun was setting. The view of it on the horizon was

marvelous. While relaxing in the garden outside my residence I noticed the sound of bustle on the streets below. I wandered across the garden and over to the edge of the platform, where I peered down to see many Eilanas busying themselves with setting up decorations and stalls that looked rather similar to those we'd seen in Mikato market and adjacent streets. I wondered if they were preparing for some sort of a festival. It was disappointing to know that we'd be leaving before it started.

We all assembled at our usual meeting point, at the designated time. I got the distinct feeling none of us could fully remember the events of the previous evening. And while the anti-hangover tech suppressed the physical symptoms of a hangover, it couldn't suppress the inevitable moral hangover that arises from partial recall of events. And so, when we all convened that morning, not a lot was said. We all sort of stared at the floor, muttered about the weather a bit, and didn't really make any eye contact with each other.

Rosral, on the other hand, appeared quite unphased by the previous evening, despite her having clearly consumed as much alcohol as the rest of us. Upon noticing our general state of moral hangover, she grinned. It was obvious that she found the situation amusing. Hilarious, even.

"How are you all feeling?" she asked.

"Umm. Yeah. Okay, all things considered," Dr. Kallas replied.

"Did you enjoy our trip to Voriss?" Rosral asked, still grinning.

“Yeah! Yeah,” Dr. Madson replied.

“The food was amazing!” Dr. Nara added. “Thanks, Rosral!”

“Yes,” Rosral replied. “I thought so, too!”

“You folks put on quite the performance last night!” Rosral stated. “It was so fascinating, in fact, that it is now featured in the cultural archives!”

“Wait, what?” Dr. Williams replied in shock.

“Cultural archives?” Dr. Kallas asked. “What does that mean?”

“The cultural archives are a repository where notable and significant cultural happenings are recorded for posterity,” Rosral replied. “Your raucous behavior attracted significant attention and fascination of passers-by. As such, the episode was logged. Well, not just logged in this case. It started trending a few hours ago! Here, I’ll show you!”

Rosral proceeded to show us holographic highlights of our escapades, in all their detail, via her handheld device. The experience was absolutely mortifying. As it turned out, I hadn’t imagined Dr. Kallas singing. But what I hadn’t remembered, or maybe I just blocked the memory subconsciously, was Dr. Williams taking off his clothes in a very crowded and public place and then proceeding to dance.

“Right,” Dr. Williams stated, after seeing the footage. “I’m staying well clear of that Simi stuff from now on.”

“Yup, me too,” Dr. Kallas added.

“I think I need a bit of a lie down after seeing that,” Dr. Madson added.

“I think I need a bit of a drink after seeing that,” Dr. Nara added.

“Actually,” Rosral replied, “it wasn’t the Simi that caused you to do those things. This anti-hangover tech that you’re all so excited about also prevents excessive drunkenness. It isn’t possible to get that wasted.”

“Are you sure that works on us humans?” Dr. Madson asked.

“Yes,” Rosral replied.

“So, what explains this?!?” Dr. Williams exclaimed.

“One of the mushrooms you consumed caused an unexpected neurological effect on your species,” Rosral replied.

“See! I told you we should be wary of the food here!” Dr. Williams stated.

“Thank god we’re not lighweights!” Dr. Nara added.

The mushroom explanation didn't exactly ease our suffering. Okay, maybe slightly. I was just glad I hadn't been the one who took off my clothes and started dancing.

Later that morning we convened for day three of our seminars which was expected to cover environmental stabilization and quantum spacetime inference. The environmental stabilization seminar was not about their dome technology, as a few of us had assumed, but about technologies they could provide us to help stabilize Earth's environment and reverse the effects of climate change. Some of it was common sense – plant more trees, be more energy efficient, produce less waste, don't live beyond our means, stop polluting the environment, and so on. However, Rosral did provide us with some fundamentals on techniques that could help absorb carbon from the atmosphere and remove plastics from our seas along with relevant mechanisms to deploy the technologies.

“Your planet's environmental problems are easy enough to fix,” Rosral informed us. “But collective action is still required to prevent other potential environmental catastrophes from occurring in the future.”

“We will need your leaders to promise to adhere to certain policies and frameworks first,” she continued. “Only then can we fix your immediate and impending climate emergency.”

“Oh, and by the way, when we say ‘promise to adhere’, we mean it,” she added. “None of this ‘climate accord’ nonsense that inevitably leads nowhere due to your species’ propensity to want to make rich people even richer.”

“Good luck with that,” Dr. Williams replied.

Our afternoon seminar was about quantum spacetime inference and included a long section on material science matters related to the creation of higher resolution devices. Rosral also included some tips and tricks based on our current implementations that would allow for better image quality, faster processing, and handling the viewing of locations with no natural light, such as under water, inside solid matter, and the like.

We noted the absence of seminars covering topics such as jump drives, artificial gravity, and translocation, and when we asked Rosral about those, she explained that we would receive more information on those technologies after a set of fundamental principles had been understood and implemented by us.

“Many of the topics you’ve learned about during our seminars are contingent on the development of good power generation capabilities,” Rosral informed us. “And your species are especially lacking in that regard.”

“Most of your problems are caused by your species’ adherence to broken economic and political models,” she added.

“Was the study of our species difficult for you?” Dr. Madson asked. “You know, because of all the societal problems. I mean, our society is quite the opposite of you’re the utopia you’re accustomed to.”

“I was warned about how exacerbating it might be,” Rosral replied. “And yes, frankly, your society is very different to ours. And frustratingly illogical. But this was my first assignment of this kind, so I have no frame of reference. It might well be that most species at your level of development are similar.”

Our scheduled seminars ended in the evening of that third day. It was starting to get dark in Vedess and we noticed, for the first time, lights on the underside of Seris platforms illuminating nearby areas. The dimly-lit atmosphere was very relaxing feeling.

We were, once again, taken for a round of cuisine sampling at Mikato market. Apparently Rosral couldn't get enough of that place. Mikato market was a lot busier than it had been during the day and we had to push through a crowd to get to the stall Rosral recommended. The line was long and while waiting for our turn we noticed that many Eilanas were sampling local alcoholic beverages. Some were already visibly intoxicated. We wondered if their behavior would also end up in the cultural archives.

After a good twenty-minute wait, we were finally served. The dish was, according to Rosral, more akin to the everyday food that the Eilanas eat, and that was why the stall was so popular. It was, however, still an "ancient" take on the cuisine. The dish consisted of a fabricated protein similar to fish, grilled delicately over coals, and flavored only with local salt. The meat itself was thin and very delicate, and the dish was served with a finely shaved local vegetable somewhat like radish. The flavor of the fish-like protein was exquisite, and no sauces or spices were seemingly required. It reminded me of dishes I'd eaten during the short time I'd spent in Hokkaido. Rosral told us that it can take several years to learn how to cook

the dish, which she told us was called “Uhni”, and that sustenance fabricators simply don’t do the dish justice, what with its delicate seasoning and smoky aroma.

Following our evening meal, Rosral informed us that we’d be heading back to Earth. Rosral told us that, on the way back, she’d be showing us some interesting sights and that we’d also be visiting some of her friends. We were beamed directly into the unfurnished observation lounge and, upon arrival, Rosral conjured us up a set of nice comfy chairs to sit in.

We sat back and looked out of the ship’s observation port. The view of Beta and its host star, as we’d seen it when we arrived was still impressive. Thousands of ships, habitation platforms, and space stations dotted our view, as far as the eye could see. Rosral engaged the ship’s drive and in the blink of an eye, the view changed.

Chapter 31 A tour of the local neighborhood

Our first stop took us to a location just outside of our own Milky Way galaxy.

“We’re in an intergalactic void adjacent to the Milky Way galaxy,” she stated. “A suitable vantage point in which to view your entire galaxy.”

Rosral touched a few controls on a console. Annotations marking features including the location of our own solar system, the supermassive black hole at the center of the galaxy, and hundreds of other solar systems appeared on the observation port.

“What is the significance of those other marked systems?” Dr. Williams asked.

“Those are other inhabited worlds in your galaxy,” she replied.

“There must be hundreds of them!” Dr. Kallas stated. “We’ve probably only discovered a handful of them so far.”

“That’s not surprising,” Dr. Williams replied. “Studying the estimated forty billion Earth-sized planets orbiting habitable zones of Sun-like stars and red dwarves within the Milky Way will take us decades.”

“We’ve been doing just that for tens of thousands of years,” Rosral replied. “And we still haven’t fully mapped all areas of our own observable universe.”

“But you clearly must have detailed maps of your own local neighborhoods?” Dr. Williams asked.

“Yes,” Rosral replied. “And although our detailed maps extend all the way out to your galaxy, there’s plenty we still don’t know about.”

“Even with all that compute?” Dr. Nara asked.

“Yes,” Rosral replied. “Even with all that compute.”

Our next stop presented an observation of similar nature to the previous - a view of the galaxy where the Eilanas resided. In contrast to our previous view of the Milky Way, this

galaxy was much brighter and more densely packed, and consisted of four closely situated nuclei.

“This is a view of our own galaxy,” Rosral informed us. “We call it Enit. Your name for it is difficult to remember and not as catchy.”

“I don’t even remember the name,” Dr. Kallas stated. We all nodded in agreement.

“Enit is easy to remember!” Dr. Nara stated. “And a pretty name, too!”

Rosral nodded and smiled.

“Compared to the roughly two hundred billion stars in the Milky Way, Enit contains over thirty trillion stars,” Rosral stated. “Our species relocated to Enit some fifty thousand years ago.”

“Wait, did you say relocated?” Dr. Kallas asked.

“Yes,” Rosral replied.

“Why did you relocate?” Dr. Williams asked. “Did you have some sort of disaster on your planet?”

“Enit, with its higher star density is a lot more convenient location for colonization,” Rosral replied. “We can easily find habitable planets in nearby systems suitable for colonization. Sometimes we don’t even need to terraform them.”

“Also, some of our allies had already moved there,” Rosral continued. “It was quite the up-and-coming neighborhood at the time. It also made a lot of sense from the perspective of defense.”

“Defense? From what?” Dr. Williams asked.

“From advanced threats,” Rosral replied.

“Advanced threats?” Dr. Williams exclaimed. “What could possibly pose a threat to someone with your level of technology?”

“Oh, you’d be surprised,” Rosral replied.

Rosral’s ship jumped to another location. This time it was a dark and featureless place. I wondered, for a moment, whether we might be looking at a black hole. I quickly dismissed the notion when considering that we’d at least see some photons emanating from its accretion disk. Rosral altered the settings of the viewport slightly, and a small spherical object was revealed.

“What you’re looking at is a quark star,” Rosral stated. “Quark stars form via the collapse of neutron stars under the right conditions. Which are rare. This quark star formed from the

collapse of a magnetar. The resulting phase transition releases a flash, or quark nova, equivalent to more than fifty times the amount of light emitted by your entire galaxy. Quark novae are some of the brightest events in the universe and are guaranteed to eliminate life on planets in sufficiently close proximity.”

“Aren’t these things, like, really dense?” Dr. Kallas asked.

“Remarkably so,” Rosral replied. She found a small device on a counter near her control console and held it up. It was roughly the size of a matchbox. “This amount of material from that quark star would likely weigh more than your Moon.”

“How big is this thing?” Dr. Nara asked.

“Just a few Earth kilometers in diameter,” Rosral replied.

“Magnetars make up about ten percent of all neutron stars,” Rosral explained. “The other ninety percent are pulsars. Magnetars have extremely strong magnetic fields. Within their magnetic fields, atomic orbitals deform into rod-like shapes. The magnetic field of a magnetar is lethal even at a distance of one thousand kilometers. The strong magnetic field essentially renders the chemistry of known lifeforms impossible.”

“Umm. How close are we to that?” Dr. Madson asked.

“Considering the shielding technologies on this ship, we’re a safe distance from it,” she replied. “If you were in one of your own space craft, you’d have been killed instantly.”

“So, these things are small, dense, and extremely dangerous to approach,” Dr. Nara repeated.

“Fascinating.”

“Not just fascinating,” Rosral replied. “Have you been finding these in your QUERY scans?”

“Not that I’m aware of,” Dr. Williams replied.

“Precisely,” Rosral stated. “They’re very difficult to find. They’re almost invisible due to their size. When you finally develop enough technologies to build ships with warp drives, you’re going to need to have every little object in your flight path identified and mapped. There are over a billion neutron stars and black holes in your galaxy alone. And you wouldn’t want to go flying near one by accident.”

“See?” Dr. Williams stated. “This Star Trek crap really is pure science fiction.”

“Not so!” Dr. Kallas replied. “They have long range sensors and stellar cartography. The lore indicates that they had that problem solved before venturing out. And the timeline starts at least a hundred years from our current date...”

“Yes, yes.” Dr. Williams replied, clearly unamused.

Talking of black holes, our next stop was quite the sight. The ship had jumped to a location suitable for observing Sagittarius A*, a supermassive black hole at the center of our galaxy.

Rosral began with some trivia

“The black hole we’re observing has a mass slightly in excess of four million of your own stars, and a diameter of roughly sixty million kilometers. For comparison's sake, the distance from the Earth to your Sun is one hundred and fifty million kilometers. This black hole is surrounded by an orbiting ring of gas and dust travelling at approximately thirty percent of the speed of light.”

“It is also orbited by a series of stars, some of which are travelling at up to eight percent the speed of light,” Rosral continued. “The nearest star's orbit comes as close to the black hole as the distance between your host star and Saturn.”

Through the view port, we observed a faint halo-like glow, presumably the accretion disk, and occasional flashes and flares which Rosral explained were small objects entering the black hole.

Chapter 32 Esid

Our next stop was to a location in orbit of a planet. It wasn't Earth and none of us immediately recognized it. Rosral clarified the situation for us.

“I read a recent Earth publication detailing a mysteriously vanishing galaxy,” she informed us.

“Yes! The vanishing galaxy hypothesis!” Dr. Kallas exclaimed excitedly.

“Wait, you read our publications?” Dr. Williams asked.

“Not all of them,” Rosral replied.

“We encountered a similar phenomenon during our early years of quantum spacetime inference research,” she continued. “That mystery remained unsolved for us for tens of thousands of your years.”

“Tens of thousands of years?!?” Dr. Williams exclaimed.

“Yes,” Rosral replied. “We weren’t in a position to solve the mystery until we’d developed technologies that enabled us to travel to the theoretical location of the galaxy.”

“Oh wow,” Dr. Kallas replied. “The long way round. So, you didn’t get contacted by a more advanced race back then, like you contacted us?”

“Things were different back then,” Rosral stated. “You guys are lucky.”

“Apparently so!” Dr. Kallas remarked.

“Upon arrival, our ship was pulled to this planet,” Rosral explained. “We were subsequently greeted by an advanced race. The Essan.”

“Did you have these alliances back then?” Dr. Madson asked.

“We did,” Rosral replied. “But the Essan weren’t part of one. We did, however, develop a friendship with them.”

“Wait, so there are advanced races that aren’t part of any alliance?” Dr. Kallas asked.

“Yes,” Rosral replied. “A very few.”

“And...” Dr. Williams prompted, waving his hands, “...was the galaxy cloaked from QUERY scans?”

“It was,” Rosral replied. “Of course.”

“Do you have that sort of technology?” Dr. Kallas asked.

“No, it is way beyond our understanding,” Rosral replied. “The Essan are an ancient race. Much older than ours.”

“How much older?” Dr. Madson asked.

“Well, we suspect they may have visited your planet in the distant past,” Rosral replied. “The very distant past. Millions of years ago. That is why I’m taking you to meet them.”

“And they live on this planet?” Dr. Williams asked.

“Yes, they do,” Rosral replied. “We call this planet Esid. I’ll translocate us to the surface now.”

And just as Rosral had finished her sentence, we were translocated to the surface of Esid.

Upon arrival, we were greeted with a sight we weren't expecting. We were assuming to see a landscape covered with technological wonders and megastructures. Instead, we arrived in a small and rather primitive village nestled in a jungle. The village contained a number of open-air buildings constructed out of logs, branched, and the leaves of local plants.

The location we'd beamed into was hot and humid, and quite a departure from the slightly-colder-than-comfortable environment that the Eilanas enjoyed. After a few minutes, we were all sweating profusely. Rosral seemed oddly fine with the climate, despite having originated on a planet that was very much colder than our own. A single Essan was there to greet us when we arrived. Rosral's translator worked for their language. One odd thing, though, was that when we spoke, our words weren't translated back into Essan language. And yet they were able to understand us. We never quite understood how that worked.

Rosral introduced us to our host. “This is Kaano,” she stated. Kaano bowed.

Kaano was a tall, slender member of the Essan species, with long arms and hands. His skin was a dark gray color, with a subtle pattern of small, colorful scales. He had large, round eyes and slightly pointed ears. His head was quite large and broad, and he had two horns atop his head. Finally, his long body had several ridges along its spine.

We were shown to a series of fallen logs that served as a seating area, and the Essan, noticing our discomfort, brought us some water in carved wooden cups. It was tepid and didn't quite taste pure, but it quenched our thirst. Before we could ask why we'd been sent to some tropical holiday resort, Rosral started to explain the situation.

"For hundreds of millions of years, the Essan advanced technologically," Rosral told us.

"They were part of many alliances and led many councils in their local intergalactic neighborhood. However, they eventually reached a point where they no longer felt the impetus to innovate any further. They had everything they needed. And so, they collectively concluded that it was time for other species to take over. And then, shortly thereafter, they initiated their cloaking mechanism and retreated to their home galaxy where they now eschew technology and live in simplicity."

"So, what you're telling us is that they retired?" Dr. Williams asked.

"Yes," Rosral replied. "That would be an adequate Earth analogy."

"But how could they possibly live without the drive for new knowledge and exploration?"

Dr. Kallas asked. "Don't they just get bored now?"

"Plenty of civilizations, even on Earth, seek to find balance with nature and their surroundings, and don't strive for innovation beyond the means to live comfortably. That is what we chose," Kaano replied.

The spoken language of the Essan was highly advanced and alien in nature. It could perhaps be characterized by a series of clicks, whistles, and chirps. The sounds Kaano made were accompanied by a range of intonations and vocalizations that perhaps indicated the emotional state of the speaker. His language also seemed to include a complex system of gestures and postures designed to convey meaning.

“Like the native Americans?” Dr. Nara asked.

“Indeed,” Kaano replied. “Exactly that sort of philosophy.”

“I brought these humans to meet you because I believe your species may have visited their planet in the distant past,” Rosral stated.

“Your assumption is correct,” Kaano replied. “Our ancestors did indeed visit their planet.”

“When?” Dr. Williams asked rather abruptly.

“During what you would term your Jurassic period,” Kaano replied. “Approximately sixty-five million years ago.”

“Wait, so your species had intergalactic travel capabilities sixty-five million years ago?” Dr. Kallas asked in a rather startled tone.

“We did,” Kaano replied. “Our ancestors travelled to Earth in order to study your vibrant Jurassic ecosystem in detail, as a means to understand evolutionary lines similar to their own.”

“How long did you stay?” Dr. Madson asked.

“We had researchers stationed there for many thousands of years,” Kaano replied. “We built many research stations and labs. There must have been thousands of us there at the time.”

“Umm. Stupid question, perhaps,” Dr. Williams stated, “but why didn’t you stop the meteor that killed them all?”

“We had non-interference directives even back then,” Kaano stated. “The same ones that still exist today. We don’t meddle with the affairs of species that haven’t achieved a certain level of technological advancement.”

“The Prime Directive,” Dr. Kallas replied.

“I’m not familiar with that term,” Kaano replied.

“Well, you wouldn’t be,” Dr. Williams replied. “It’s made up.”

“Ahh, I see,” Kaano replied. “Consider the fact that we wouldn’t be talking to you if we’d stopped that meteor.”

“You have a point,” Dr. Kallas replied.

“But you’d have stopped a whole lot of nazis being born and taking over the world,” Dr. Nara whispered under her breath.

“Would you like access to the material our ancestors collected from that time?” Kaano asked.

“Oh, wow, yes!” Dr. Madson replied.

“The data should now be in Rosral’s ship’s computer,” Kaano replied.

“Wait, how can you transfer data to Rosral’s ship from this backwards-ass place?” Dr. Williams asked.

Our Essan host apparently didn’t hear his question. Or chose to ignore it.

Our conversation with Kaano continued for some time. He was very calm and projected a great deal of wisdom. He spoke at length about the Essan’s need for harmony with nature and their planet. From what we had gathered, they, like the Eilanas, had developed medical technologies that allowed their lives to be extended almost indefinitely. We didn't learn too much more about them, though. They had, from all accounts, been one of the most powerful and advanced races in our observable universe for a very long time. And from what we deduced, they had at their peak, been a great deal more advanced than the Eilanas.

Observing Rosral, we deduced that the Eilanas must have held the Essan in very high regard, and we wondered if perhaps they'd played a part in helping the Eilanas develop to where they were today. Or perhaps the Eilanas owed the Essan some great favor.

During our stay, the Essan produced some cold food made from local fruits, which was both unique and delicious, and some tea, which despite the heat and humidity we graciously accepted and consumed. The tea was very pleasant and tasted like nothing we'd ever had before. Despite being hot, it made us feel a little less sweaty afterwards. I would have loved to bring some back to save for the hot and humid heatwaves we'd been experiencing on Earth almost every summer since the climate crisis had amplified. Dr. Williams whined profusely throughout the entire visit, claiming he was itchy and that he was sure there were insects in the log we were sitting on. Dr. Madson had to tell him to shut up on more than one occasion.

Our visit with the Essan was brief, but enlightening. We returned to Rosral's ship where the cold, dry conditions were a relief and helped us dry off within minutes.

Rosral conjured up a console in the observation lounge, and we used it to view some of the research materials the Essan had taken while on expedition on Jurassic Earth. It turned out that the materials were fully detailed holographic captures of our planet at that time. And there were many of them. We watched actual footage of Earth during the Jurassic period that included many images of local wildlife, including favorites such as the Brontosaurus, Stegosaurus, Triceratops, and of course Tyrannosaurus Rex. Rosral suggested we take the data back with us to Earth, and she provided us with a "Jurassic computing device capable of interfacing with human systems" (i.e., a hard drive).

Our last stop on the tour was Earth. Upon arrival, we thanked Rosral and asked when we'd next be able to visit them. She told us she wasn't aware of such plans but would tell us if and when she found out. She remarked to us "it was fun to hang out - did I get that right?" and a moment later we were translocated back to Earth.

Chapter 33 Down to Earth

We all arrived in a corridor a few dozen meters from our lab. Luckily, no one else appeared to be in our vicinity upon arrival.

"What an odd place to send us to," Dr. Kallas remarked.

"Well, we're not far from the lab," I replied. "Let's go."

"That time-dilation bubble thing," Dr. Kallas stated, "do you think Rosral was serious about it?"

"My phone seems to agree with the premise," Dr. Madson replied.

"Let's check a computer in the lab, just to be sure," Dr. Williams stated.

And so, we made our way hastily to the lab.

Upon arrival, we met one of our junior researchers, Jane. She was working at a console and turned to greet us as we entered.

“How did it go?” she asked.

We all looked at each other. Did she know we’d been away for three days on an alien planet? If so, how? Dr. Kallas quietly made his way over to a nearby terminal to check its date and time. I turned to him, and he gave me a discreet thumbs up.

What the Eilanas had told us about encapsulating our solar system in a time dilation field had, apparently, not been a joke. Upon our return to Earth, it seemed apparent that nobody had missed us or even noticed we'd been away.

“Um. The meeting, you mean? Well. You know. Um. Boring bureaucratic stuff. The usual,” I replied.

“Right then,” she replied. She stopped what she was doing and turned to us. “Oh, by the way, looks like you had a delivery.” She pointed to a large box in a room off to the side of our lab.

“But I wasn’t expecting... Oh god, not another wrong delivery. Thanks for letting me know, Jane, I’ll deal with it later on” I replied. She nodded.

We all continued to stand in a tight group at the entrance to the room looking awkward, wondering if she knew.

Dr. Kallas returned to where we were and whispered, “I don’t think Rosral was joking about the time dilation bubble.”

And then we all shuffled awkwardly to our desks. I think Jane noticed we were acting weird. She got up and left the office, informing us that she was going to get a coffee. And after she'd left, we were able to converse freely once more.

"We did just all go on a three-day excursion to an alien planet, right? I'm not recalling a vivid dream or a hallucination or something?" I asked.

"I remember it all, too," Dr. Madson replied.

"Yep, me too," Dr. Nara added.

"I don't think a group hallucination is still out of the question," Dr. Williams stated. "It would be useful if we had some physical proof of the trip. Just to be sure."

"We do," Dr. Kallas replied, smiling. "I still have my blue card!" He held the card out in front of us. We all rummaged through our pockets and bags and found our own cards.

"Rosral kept her promise!" Dr. Nara remarked.

"Check this out!" Dr. Williams stated, as he activated his card, and much to our surprise, it presented a holographic map of the building we were in.

"These work here?" Dr. Kallas replied. "I thought they were dumb mobile devices that interfaced with some local server in Vedess!"

“Open the translocation menu,” Dr. Nara said.

Dr. Williams opened the menu and, amazingly, it suggested a series of nearby translocation points.

“Go on, then,” Dr Kallas said, “click on one!”

“No way!” Dr. Williams replied. “I don’t want to end up materialized into a wall.”

“I’ll do it,” I replied, “for science.”

I pulled my blue card out of my pocket and chose a translocation point on the roof. The translocation functionality worked, and I appeared not too far behind someone who was up there, having a smoke. Luckily for my sake she hadn’t been facing me and didn’t even hear my arrival. I wasn’t able to immediately activate the translocation functionality again, and so quickly put the card away before the smoker turned around. After a slightly awkward conversation with her, she stubbed her cigarette out and left. I pulled the card out of my pocket and accessed the menu. The translocation option was available and I used it to return to the lab.

“We were worried for a minute there!” Dr. Madson remarked.

“It took some time for the translocation thing to recharge,” I stated.

“Boy, are we gonna have fun with these!” Dr. Williams noted.

“Ohmygod! Yeah!” Dr. Nara replied. “Do you realize what we can do with these?”

“Commute?” Dr. Madson replied.

“Think bigger!” Dr. Nara stated.

“Umm. I dunno. Rob a bank?” Dr. Kallas replied.

“Yeah! For one!” Dr. Nara replied.

“Dr. Nara has a point,” Dr. Williams stated. “It would be trivial to translocate into a sealed bank vault after hours, steal money, and translocate out. No break-in needed. A completely untraceable crime, if done right.”

“Yes, but we’re not going to be doing that,” Dr. Madson added.

“Why not?” Dr. Nara stated. “We’re paid peanuts. Look at what we’ve done for humanity. We’re literally a liaison to an ancient alien species. And nobody seems to appreciate our work. Isn’t it about time we get paid?”

“If we’ve learned anything from the Eilanas, it’s that money doesn’t matter,” Dr. Madson replied.

“On their world it doesn’t,” Dr. Nara stated, “but here it does. And besides, I’m broke. And I have bills coming out of my ass.”

“Ahh, wait!” Dr. Williams stated, clicking his fingers. “According to Rosral, these things can materialize matter. We needn’t rob a bank if we can simply create money. I’m sure I can figure out how to do that.”

“Okay, let’s stop trying to commit crime with these things,” I stated. “For now, commutes are what we’re allowed to use these cards for, and nothing else. And make sure you don’t teleport near anyone who might witness it.” They nodded. “And for the love of god, don’t misplace these things.”

“So, the trip was real, then,” Dr. Madson stated.

“That means,” Dr. Kallas replied, “that translocation, matter synthesis, star ships, floating platforms, cities built into mountains on the edge of the world, miracle mouthwash, and all the other strange and wondrous things we’ve just experienced are also real.”

“And, importantly,” Dr. Nara added, “anti-hangover tech is an actual thing.”

“The fact is,” Dr. Williams added, “we spent three days on an alien planet and toured the local universe. And less than half an hour passed on Earth.”

“To be honest, I’m used to the time dilation effect of meetings working the other way around,” I replied.

We weren't sure what to do next. Our research had been trivialized. It felt like a complete waste of time to continue it. The feeling was like going from being a rocket scientist to someone who scrubs toilets. I was about to retire to my office, or perhaps even leave for the day, when I remembered the package Jane had mentioned. As I went to the side room to inspect it, the others unenthusiastically returned to their desks. To catch up on the thirty minutes' worth of emails they'd missed, presumably.

The package itself was a very large cardboard box. About the shape and size of the sort of package a fridge-freezer comes in. Upon approaching it, I spotted some Eilanas glyphs printed on the box in a small typeface.

"Umm. Guys! This looks like a package from Rosral!" I shouted, excitedly.

The others immediately ran over to join me. We frantically removed the cardboard to find an Eilanas quantum spacetime inference console. It was identical to the ones we'd used on Beta. A note, written in English, was attached to it. It read "Don't bother trying to reverse engineer this."

"Oh my god!" Dr. Nara stated. "These things are real?"

There was no need to plug the device in. It was self-contained and self-powered. We turned it on.

"Yep, this is the same one we used on Beta," Dr. Kallas stated.

“Wait,” Dr. Williams added. “There’s an extra menu option here.”

“How did you spot that so quickly?” Dr. Nara asked.

“Well, if you’ll remember, I was the only one who wasn’t completely hammered while we were using these things!” he replied.

“Well, I wouldn’t say completely hammered,” Dr. Kallas replied. “Okay, so what does it do?”

“It appears to be some sort of uplink,” Dr. Williams replied. “It probably replaces our data transfer link. We’ll need to figure out how to wire it into our own systems. Hmm. I’m seeing something else here, too. Possibly some sort of video chat.”

“Intergalactic video chat!” Dr. Nara remarked. “Can we get Rosral on the line?”

“It looks like that would be possible,” Dr. Williams stated.

“Umm, guys,” Dr. Madson replied. “We should cover this thing up before someone else sees it!”

“Rachel has a very good point,” I stated. “We need to keep this hidden.”

“Let’s cover the windows with paper,” Dr. Nara suggested.

“And we’ll need to keep this room locked,” I added. “I’ll get you all keys.”

During the next fifteen minutes or so, we worked together to cover the windows with newspaper. Luckily nobody entered the lab during that time.

“Right,” I said. “Let’s make sure nobody, and I mean nobody aside from us ever gets into this room. Including cleaners.”

“You’d better change the locks,” Dr Kallas replied.

“Yep,” I replied, “I’ll get facilities in... no wait, we’ll need to do that ourselves.”

“Come on then!” Dr. Nara exclaimed, “Let’s call Rosral!”

Dr. Williams accessed the interface and initiated a video call. A large as life holographic representation of Rosral appeared in front of us. She was sitting outside, in a park, drinking a cup of Oress. We could see the Seris structures of Vedess stretching out behind her.

“I see you received my gift!” she remarked, grinning.

“We did indeed!” Dr. Kallas replied.

“How are you doing, Rosral? Was your trip home good?” Dr. Nara asked.

“My trip home was instantaneous,” Rosral replied.

“We weren’t sure the whole thing we just experienced was real,” Dr. Madson stated.

“Yeah, it was so surreal that we thought it might be some sort of group hallucination,” Dr. Kallas added. “But we found out that we still have these blue cards!”

“Disorientation is apparently common in these first visit situations,” Rosral replied. “I read about it prior to your visit.”

“We miss you already!” Dr. Nara exclaimed. “When can we come back?”

“Yeah! When can we come back?” Dr. Kallas added.

“I do not see any mention of scheduled visits for your team on our roster,” Rosral replied. “But I can keep you informed.”

A palpable sense of disappointment filled the room.

“I see this device replaces our intergalactic data transfer mechanism,” Dr. Williams stated.

“Are there any instructions on how to link the interface to our computers?”

“I’ll send them over shortly,” Rosral replied.

We all felt increasingly down in the days following our return to Earth. The experience we'd had on Beta was beyond imagination, and we'd learned more during those few days than we had in years on Earth. Beta was so clean, so pleasant, and so convenient. And the food was literally out of this world. Returning to the humdrum of regular work, dirty human cities, money, taxes, bureaucracy, the toxic political situation, and the need to do everyday chores was not pleasant. The feeling was like having to go back to work after a long and relaxing holiday. Or the end of the summer holidays as a child.

And, as time passed, I felt less inclined to work. As the saying goes, I couldn't be less arsed. Or was it more arsed? I could never remember. Either way, I felt disillusioned, defunct, trivialized, and directionless. It was clearly apparent that my colleagues felt the same.

Witnessing their level of technology, so far advanced from our own as to almost feel like magic had been addictive. And we were now all in acute withdrawal. And after a few days, we all sort of snapped at the same time. I recall arriving at the lab one morning to find the rest of my team comparing shiny new things they'd recently purchased. They were so enthralled with what they were doing that they didn't even notice my entrance.

"Check this out," Dr. Kallas remarked, pulling his sleeve back to reveal a smart watch.

"Is that the latest Apple watch?" Dr. Nara asked.

"Yep! Complete with the latest multi-link strap," Dr. Kallas replied. "In black."

"Aren't those straps, like, five hundred pounds?" Dr. Madson asked.

“Yep! Four ninety-nine.” Dr. Kallas bragged.

“Are those new shoes, Rachel?” Dr. Nara asked.

“They are indeed!” Dr. Madson replied.

“They look expensive!” Dr. Nara remarked.

“I think they retail for around a thousand pounds,” Dr. Madson replied. “But that new bag of yours probably set you back a lot more, didn’t it.”

Over to the side of the room, I saw Dr. Williams was playing around with that looked to be a brand-new iPad Pro.

“Ahem!” I announced. Everyone stopped talking and turned to me.

“Please tell me this isn’t what I think it is,” I asked.

“No, wait, we can explain!” Dr. Kallas pleaded.

“Did you rob a bank or did Robert figure out how to print money?” I asked.

“We didn’t rob any bank and we didn’t print money. We didn’t even buy this stuff,” Dr. Nara replied.

“Wait, did you translocate this stuff straight out from the shops?” I asked. “That’s still technically stealing.”

“If I might explain,” Dr. Williams replied, stepping forward. “I figured out how to scan things into the blue card’s memory buffer and then have it fabricate them.”

“Yeah, what Robert said!” Dr. Kallas added. “Just point the card at the item. It captures it in detail. Down to the last atom.”

“And so, we went on a shopping trip yesterday,” Dr. Nara added.

“Where we scanned in all the things we wanted,” Dr. Madson stated.

“And then we replicated them here in the lab. This morning. A few minutes before you arrived,” Dr. Kallas added.

“Right,” I replied.

“We scanned a lot of stuff in,” Dr. Williams replied. “Here, take a look. I can replicate you anything in this memory buffer.” Dr. Williams scrolled through endless three-dimensional representations of items they’d scanned including more shoes, bags, jewelry, watches, electronic items, clothing, and a whole host of other random paraphernalia.

“Interesting! What is the largest item you can scan and replicate that way?” I asked.

“We only tried it with small items,” Dr. Williams replied. The biggest thing was probably one of those fancy and expensive coffee makers.

“Oh, but wait there was that...” Dr. Kallas added.

“Eighty inch television,” Dr. Williams continued.

“So, nothing like a bike or a car or a piece of furniture?” I asked.

“No, we didn’t try that yet. Didn’t occur to us,” Dr. Kallas replied.

“We did try food, though,” Dr. Williams stated. “I scanned a kebab. But the materialized one was cold.”

“Was it cold when you scanned it in?” I asked.

“Yes, it was,” Dr. Williams replied. “Good point.”

“Oh, hey, we found something else!” Dr. Nara stated excitedly. She activated her own blue card, scrolled through several menus, and selected an option. A bottle of Sec appeared on a table in front of her.

“It has pre-programmed items?” I asked.

“Yeah! A lot of them!” Dr. Kallas replied.

“And when did you discover the Sec thing?” I asked.

“Yesterday evening,” Dr. Madson replied.

“Okay, that would account for the hangovers some of you look like you have,” I replied.

“Right. What else do we think this blue card can do that we don’t yet know about?” I asked.

“I’m glad you asked! I have some theories...” Dr. Williams answered.

“Me too!” Dr. Kallas added.

Chapter 34 Recruitment drive

A few weeks after returning to Earth, I was summoned to meet with several other scientists and some of the UN representatives who had also been hosted by the Eilanas. During those rather formal and long meetings, it was concluded that we'd need to start involving a lot more people in the project, especially scientists in fields relevant to information the Eilanas were sharing with us. Naturally, anyone recruited would need to be trustworthy enough to keep the project a secret. And so, I was placed on one of several small teams assigned with recruiting new scientists.

The recruiting effort ended up lasting a few months. And it took up most of my time. During that period, Drs. Kallas and Williams returned to their research on HEX, and from what I

heard, made some significant progress. Drs. Madson and Nara worked on a line of artificial life research proposed by Dr. Nara. I didn't really understand what it was they were doing, but, on a high level, it sounded interesting. My recruitment work had me flying here, there, and everywhere. Which was horrible not only because of having to spend countless hours in airports and on planes, but because of increasingly stringent airport security protocols brought about by the ever-present terrorist threat posed by the irrationalists. I really wished our blue cards would have allowed for longer translocation jumps – to anywhere in the world, for instance. But it seemed as though they didn't. Both the work and travel were tiresome and kept me from doing any meaningful research for quite some time.

It was after several back-to-back recruiting trips that I recall returning to the lab one evening, thoroughly exhausted. Dr. Kallas was the only one still in the lab at that time. We ended up having a brief conversation.

“How's the recruitment going?” Dr. Kallas asked.

“It turns out that recruiting scientists into a clandestine initiative involving cooperation with an advanced alien race isn't nearly as easy as imagined,” I replied.

“How so?” Dr. Kallas asked.

“Well, as you know, we're focusing on recruiting from academia. We've been trying to entice people with the promise of interesting projects that come with a substantial grant,” I explained. “Unfortunately, most of the folks we've talked to are overloaded with work and don't have the bandwidth to take on new project, grant or no grant.”

“Odd,” Dr. Kallas replied. “I would have thought grant money would have worked.”

“Many showed immediate interest when they saw the grant proposal. But most subsequently declined when we told them that they’d need to sign NDAs and relocate,” I replied.

“I can see how that would be a problem,” Dr. Kallas stated. “Have you tried creating a company and enticing them over to the private sector?”

“Yep,” I replied. “In fact, we’ve created many such companies. Nobody was interested.”

“Sounds frustrating,” Dr. Kallas replied.

“It is.” I stated. “If we could just tell them the truth about what we’re doing, most if not all would probably sign up on the spot,”

“One hundred percent,” Dr. Kallas replied.

“We’re starting to run out of recruitment candidates,” I told him. “The original candidate list was run through a rather strict filtering system. Some were eliminated because of their citizenship. Political reasons beyond my control. Others failed their extensive background checks.”

“Background checks?” Dr. Kallas asked.

“Yeah, they do background checks on all potential candidates. And on their family members, extended family members, and friends,” I replied.

“Is that because of the irrationalist situation?” Dr. Kallas asked.

“It is,” I replied. “The process is designed to ensure that anyone recruited won’t accidentally talk about their work or the things they’ve seen to children, friends, or relatives sympathetic to the irrationalists.”

“Have you managed to recruit anyone?” Dr. Kallas asked.

“A few people,” I replied. “On the rare occasion a candidate expresses enough interest in joining us to sign the NDAs, the rest of the process is a breeze. I simply activate my blue card and show them holographic schematics of the technologies they’ll be helping develop. And if that doesn’t blow their mind, a quick translocation does the job.”

“I imagine that would work,” Dr. Kallas replied. “It would have one hundred percent worked for me.”

Shortly after returning from Beta, the UN were informed of our real-world experiences with the Eilanas and their technologies. Everything about the situation suddenly became real. And the UN woke up to the reality of the situation. As such, security around our project was stepped up overnight.

A few days after our return, we found specially trained and appointed security personnel in and around our own labs at all times of the day. And, when people not involved with our project asked about the situation, they were informed that we were doing critical research for the military. Nobody questioned that explanation.

However, that mode of work didn't last all too long. A few weeks later, security concerns were raised again. The official explanation was that the project had reached a critical mass wherein it was impossible to implement sufficiently strict access controls across all our teams and locations, many of which were located in public research facilities and universities.

And thus, a dedicated base was constructed in northern Sweden, in an area close to Tornio on the Swedish-Finnish border. Relocation to the facility was not only strongly encouraged, it was also heavily financially subsidized. A vast majority of the teams involved in Eilanas-related research moved there during the next month or two. As did all of us.

The facilities themselves were state-of-the-art, and the surrounding area was clean, peaceful, and beautiful. Basic facilities for researchers and their families were included in the self-contained base, and the compound itself was cleverly disguised as a warehouse. Most of the actual base, which had been constructed by the Eilanas, was deep underground. Construction took mere days to complete.

Our move to Sweden was a welcome one, especially considering the political situation. Every time I checked social media, stories about technological advances and scientific discoveries were followed by endless strings of negative, and often threatening replies. Many were outright death threats. Some were very graphic. Moving to a place that nobody knew about,

and away from parts of the world where tensions were mounting was comforting. Still, we feared for our friends and colleagues who'd refused to join the project, were not selected on the basis of where they came from, or who simply weren't applicable to the initiative by virtue of their profession.

Shortly after we had relocated to the facility, we received a visit from Rosral. She appeared in our lab, in the middle of the day, and without so much as a word of warning.

“ROSRAL?!?” Dr. Nara screamed as she ran over and gave Rosral a big hug. Rosral looked stunned and I think I saw her bare her teeth for a moment.

“Hey! Long time no see!” Dr. Madson exclaimed.

“Welcome! What brings you here?” Dr. Kallas asked.

“Just popped in to see how your relocation is doing,” Rosral answered.

“Just popped in?” Dr. Williams remarked. “You never just popped into our old lab.”

“I couldn’t,” Rosral replied. “There were other people around who would have seen me. I don’t have to worry about that here.”

“So does that mean you’ll visit more often now?” Dr. Nara asked.

“I was sort of hoping you’d come visit me,” Rosral replied.

“Ummm. How?” Dr. Williams asked.

Rosral interacted with her green card and a large device that sort of looked like one of those Japanese Dance Dance Revolution arcade machines materialized in the corner of the room.

“This is a translocation hub,” she said.

“Like the one in Vooris?” Dr. Madson asked.

“Yeah, like that one,” Rosral replied. “I’m surprised you remember that!”

“The mushrooms were consumed after that point in the evening,” Dr. Williams noted.

“Yes, sorry, my mistake,” Rosral replied.

“So, where does this one go?” Dr. Nara asked.

“To your new permanent research facility in Vedess,” Rosral replied.

“Wait, this thing can translocate us straight to Beta?” Dr. Williams asked.

“Yes,” Rosral replied.

“But we thought that technology had a limited range,” Dr. Kallas replied.

“No, it has an almost infinite range,” Rosral replied.

“Umm. Stupid question, but why did we need to travel to and from Beta in a ship, then?” Dr. Williams asked.

“Well,” Rosral replied. “When we first picked you up, we needed to stop at the edge of your solar system to install the temporal dilation encapsulation matrix.”

“Time dilation bubble,” Dr. Kallas whispered.

“So, we picked you up in our ships, just for show, I suppose. That and we figured it might be easier for you to reconcile the idea of travelling over a billion light years in a ship and not via translocation,” Rosral continued.

“Right. Okay. And the way back was because of that tour.” Dr. Williams stated.

“Yeah, and sorta just for consistency’s sake,” Rosral replied. “I mean, I could have translocated you back here from Esid. But I didn’t.”

“That was probably for the best,” Dr. Kallas replied.

“I will now show you how to use the translocation pad,” Rosral stated. She beckoned us over to the device.

“Stand on this pad and then press this button,” she said. She pressed the button and vanished.

We lined up and took turns doing the same thing. The translocation pad landed us in a large and very shiny white room that looked quintessentially Vedessian in nature.

I was the last one to translocated, and as I arrived, I witnessed Dr. Nara crouching over, kissing the ground. She got up and exclaimed, “I can’t believe we’re back!”

“You know what?” Dr. Williams remarked. “It’s been almost a full year since we were last here.”

“Nonsense,” Dr. Kallas replied. “It’s been at most a few months.”

“It’s been a whole year on Beta,” Dr. Williams stated.

“You have a point,” Dr. Kallas replied. “It’s going to take me ages to get used to the short years and long days here.”

“So, Rosral, does this transport pad mean we can come and go as much as we please?” Dr. Nara asked.

“If that’s what you wish,” Rosral replied. “However, if you would like to stay here, we have reserved many habitation facilities for you on the level above.”

“Wait, so we can stay here longer?” Dr. Nara asked.

“Yes,” Rosral replied. “Stay for as long as you like.”

“Wait, can we stay indefinitely?” Dr. Nara asked.

“Yes. If that is what you wish,” Rosral replied. “This area has been permanently reserved for you and your associates.”

“Okay,” Dr. Nara said. “I’m moving here permanently.”

“Me too,” Dr. Kallas added.

“And me,” Dr. Williams stated.

“Yup, me too,” I added.

“It’s a no-brainer” Dr. Madson added. “Can I bring my cat?”

Rosral interacted with her green card and a moment later, numerous tables, chairs, computers, large display screens, and various other pieces of equipment appeared around us in the lab.

“I’ve taken the liberty to furnish your lab with relevant equipment,” Rosral informed us.

“You’ll find familiar looking quantum spacetime inference consoles, Earth-style computer terminals, and other equipment from your Earth-based lab here. I’ve also copied everything from Earth’s internet onto one of your own computer cores. I’ve set up links from here to Earth’s internet and terrestrial channels, including radio and television from all regions on

your planet. The screen over there should work like an Earth television. The remote control is on the table over there. Is there anything else you'd like?"

"A food replicator?" Dr. Williams replied.

Rosral interacted with her green card. A large food replicator appeared at the edge of the room. "Done."

"Thanks," Dr. Williams said. "I'm starving."

Chapter 35 Our new neighbors

As it turns out, our new permanent facilities were in a different Seris to the one we'd stayed in our previous visit. We were now in Seris 14 which was conveniently adjacent to both Seris 8, where the visitor's center was, and Seris 12, home of the famous Mikato market. We were the first humans to permanently move in, affording us with the perk of being the first to choose our habitation spaces. We chose rooms adjacent to each other on the south-west facing side of the disc that overlooked Mikato market. From there, we had a clear view of Seris 8, and to the ocean on the horizon.

After moving into our new digs in Vedess, we made occasional trips back to our old lab in Sweden to collect equipment and personal belongings. After a couple of weeks, those visits all but stopped. We didn't need to bring a lot of things over anyway – Rosral had furnished our labs with everything we needed, and our rooms had both fabricators that could

materialize anything we wanted and holographic terminals that could be used for both research and entertainment purposes.

We worked, ate, and slept on similar schedules and spent evenings talking, eating, and consuming the occasional bottle of Sec in the shared gardens outside our habitation spaces. Well, okay, maybe more than the occasional bottle. And it was during one of those evenings that we noticed that the visitor's center in Seris 8 was host to some newcomers.

"Have you seen those new folks at the visitor's center?" Dr. Madson asked.

"Yeah!" Dr. Nara replied.

"What, those large aliens?" Dr. Williams asked.

"What did you call them again?" Dr. Kallas remarked. "Space hippopotamuses?"

"Ah, come on," Dr. Williams replied. "That was only before I looked up their designation in the repository."

"What are they called?" Dr. Nara asked.

"Lanass," Dr. Williams replied.

"Do you think they're a new member of the alliance? Like us?" Dr. Madson asked.

“The repository didn’t say,” Dr. Williams replied.

“You’d have to assume they are,” Dr. Kallas said. “If they weren’t, they’d probably have their own digs. Like we do.”

“Fair point,” Dr. Williams replied.

“Perhaps we should pop in and say hello,” Dr. Madson posited. “You know, to be neighborly.”

“Yeah! And if they’re noobs like us, they might appreciate talking to someone else who’s new to this place. Share experiences, stuff like that,” Dr. Nara replied.

“They have a point,” Dr. Kallas remarked.

“We need more Sec,” Dr. Madson stated. “Can you go get it?” she pleaded to Dr. Williams.

“I can’t be bothered to get up,” he replied. “You go.”

“No need,” Dr. Kallas replied. He pulled his blue card from his pocket and used it to materialize two bottles of sec on the table we were sitting around. There were already five empty bottles sitting there.

“If we’re going to talk to them, we’ll need a translator thingy, like the one Rosral has,” I stated.

“I’ve been working on that problem,” Dr. Williams replied, “using the blue card.”

“Ahh, the blue card,” I remarked, “what can’t it do.”

“We’ve managed to get the blue card to translate from Eilanas to human,” Dr. Kallas stated.

“We’ve been using it to learn Eilanas swear words.”

“Wait, what?” I replied.

“Like, you know how if you’re walking around down there, the locals will sometimes say stuff,” Dr. Kallas replied. “We’ve been wondering if they’re friendly greetings or something derogatory.”

“And what were your findings?” I asked.

“Most of what they say is stuff like hello and nice weather,” Dr. Kallas replied. “But we did find a couple of phrases that sounded bad.”

“Rawfsss,” Dr. Williams articulated.

“No, rrraw fsss,” Dr. Kallas replied.

“That’s an Eilanas swear word?” Dr. Nara asked.

“We think so,” Dr. Kallas replied. “It was untranslatable according to the device.”

“Raawffs,” Dr. Nara said.

“Come to think of it, I hear that a lot,” Dr. Madson stated.

“How does learning Eilanas swear words help us talk to the... what were they called again?”

I asked.

“Lanass,” Dr. Kallas replied. “Well, it could be a nice icebreaker.”

“You’re not quite getting the point, are you?” Dr. Williams replied. “Now that I figured out how to configure the blue card to translate between English and Eilanas, I should be able to configure it to act as a translator between English and whatever it is the Lanass speak.”

“Assuming their language is stored in the repository,” Dr. Kallas added.

“Hang on, I’ll check,” Dr. Williams stated. “Yep, it’s here. Configuring the card now...

Done.”

“Can I test it?” Dr. Nara asked.

“Sure!” Dr. Williams replied. He activated the card and held it in front of Dr. Nara.

“Hello,” she said. The card emitted a bunch of deep gurgling sounds.

“Are you sure it’s working?” Dr. Madson asked.

“I have no idea,” Dr. Williams replied. “Given that I haven’t heard them speak in real life.”

Dr. Madson spoke into the blue card. “Nice weather we’re having.” The card responded with more deep gurgling sounds.

“Hey, look!” Dr. Nara exclaimed, pointing to the entrance to Seris 8. “I think I see one of them heading over to Mikato market!”

We all peered in the direction Dr. Nara had pointed to. A figure was indeed exiting the facility.

“Let’s catch them when they come back from the market!” Dr. Madson stated.

“They’re moving quite slowly. Gives us a bit of time to finish these drinks!” Dr. Nara replied.

About twenty minutes and a few glasses of Sec later, we spotted the Lanass returning from the market. We translocated just outside of the entrance to Seris 8 in preparation.

“Who’s going to do the talking?” Dr. Kallas asked.

“Not me,” Dr. Madson replied. “I’m a bit too drunk.”

“Me too,” Dr. Nara added.

“It should be Robert,” Dr. Kallas stated.

“Why should I have to do the talking?” Dr. Williams complained.

“You’ve not had as much as us. And besides, the translator card thingy was your idea.” Dr. Madson stated.

“But...” Dr. Williams replied.

“What are you worried about?” Dr. Kallas asked. “I mean, it looks friendly enough.”

“Friendly enough?” Dr. Williams argued. “Have you seen the size of it?”

“Come on! It’s almost here!” Dr. Madson said. She pushed Dr. Williams forward. He held his blue card up and said “Hello”. The card made the same deep gurgling noises we’d heard earlier. The Lanass continued to walk towards Seris 8, seemingly not noticing.

“Try again!” Dr. Madson whispered. She pushed Dr. Williams forward again.

“Excuse me,” Dr. Williams said. The card made more alien noises. The Lanass stopped and turned to face us. It stared at Dr. Williams. We’d not seen a Lanass up close before, so didn’t really know what their faces normally looked like, However, this one looked rather angry.

“I wonder if the translator thing is misconfigured?” Dr. Kallas whispered.

“Oh, you think?” Dr. Williams whispered back.

“Perhaps if you stay really still, it’ll go away,” Dr. Madson whispered.

“It’ll go away?” Dr. Williams whispered back. “You’re the one who pushed me into its path!”

Tension mounted as the Lanass continued to stare at us. It was starting to look like the device was misconfigured. And we might be in a world of trouble. But, a few seconds later, the Lanass uttered a long an uninterrupted series of noises that sounded like those the card had made. The translation came through as it was speaking.

“I’m sorry, I didn’t notice you. I was in deep thought. My sincerest apologies. My team and I have seen you here and there and have been wondering if we should perhaps make contact. However, we didn’t know how to approach the language barrier problem. I’d be very interested in learning how you modified that device for those purposes. Oh, sorry. I forgot to introduce myself. My name is Dr. Vyspor. I’m glad to make your acquaintance.”

You cannot imagine the relief that came over us as we heard the translation.

“Dr. Williams,” Dr. Williams replied, still clearly shaken. “Umm. Sorry for ambushing you like this.”

“Not at all,” Dr. Vyspor replied. “My colleagues are inside. How about you join us?”

“We’d be glad to,” I replied.

We followed Dr. Vyspor into Series 8.

“See! I told you it would work!” Dr. Williams stated.

“But were you really sure it would?” Dr. Kallas replied.

“Of course! I have extensively studied this device,” Dr. Williams replied.

“Correct me if I’m wrong, but I wasn’t the one about to soil his underpants a few seconds ago,” Dr. Kallas replied.

“So, Dr. Williams, talk me through how you reconfigured the device to translate between our languages,” Dr. Vyspor asked as we made our way towards the entrance to Series 8 visitor’s center. Dr. Williams went into detail about his experimentation with the device. Dr. Vyspor was enthralled with everything Dr. Williams had to say. The pair of them immediately hit it off. It was almost as if Dr. Williams had found his alien counterpart.

“You know, I was the one that figured out how to interface the card with the central repository,” Dr. Kallas grumbled.

Upon arriving in the visitor's center, we immediately noticed it had been internally reconfigured quite considerably. The foyer was still circular in shape, but the ceilings were noticeably higher and the corridors leading off to living quarters, research labs, and conference rooms were larger – presumably to accommodate the Lanass' bulkier form. Dr. Vyspor led us through one of the corridors, which were now labelled in Lanass glyphs, to a research lab where his colleagues were busy at work.

The room was full of equipment that we'd never seen before. As soon as we entered the lab, Dr. Vyspor's colleagues stopped what they were doing and waddled over. It was immediately apparent that the Lanass were a very sociable and friendly species, despite their intimidating size and rather angry looking facial features.

“Are you new here?” Dr. Nara asked.

“New? No, we've been collaborating with the Eilanas for a significant amount of time,” Dr. Gerso, another of the Lanass scientists, replied.

“We're new here,” Dr. Madson stated.

“Oh, you are?” Dr. Sumis, the third Lanass researcher replied. “Well then welcome! I hope you're enjoying your relationship with the Eilanas. They're very hospitable.”

“Are you part of the alliance?” Dr. Kallas asked.

“Yes, we’ve been part of the alliance for several...” Dr. Gerso tapped on a screen nearby and brought up some data. “...of what you would term millennia.”

“We assumed you were new because you’re here at the visitor’s center,” Dr. Kallas posited.

“We conduct most of our research on our own worlds,” Dr. Vyspor replied. “We don’t need permanent accommodation here on Beta. We visit only when in-person collaboration is required.”

“What are you working on?” Dr. Williams asked.

“We’re collaborating with Eilanas scientists on new power generation technologies,” Dr. Sumis replied. “Let me share the details with you.”

The Lanass scientists then went on at length about their research. Although the translator was able to provide English words for what they were saying, the context of those words was clearly outside of any concepts we were familiar with. We nodded along, not really understanding anything, and I was surprised to see even Dr. Williams at a loss for words.

“It is customary for us to share a feast with newfound colleagues,” Dr. Vyspor told us.

“Are you hungry?” Dr. Gerso asked.

“Starving!” Dr. Williams replied.

“Then let us reconvene in ‘discussion and recreation’,” Dr. Sumis replied.

The three Lanass scientists proceeded to hurry us along to their ‘discussion and recreation’ room. Keeping up with larger beings who are in a hurry required us to practically run. When we got there, Dr. Sumis materialized a massive table full of foods from their local culture. The portion sizes were simply huge, and I watched as Dr. Williams’ eyes lit up at seeing everything in front of us. A lot of the food looked like it was battered, deep-fried, and rather greasy.

“There’s no feasting without a good drink,” Dr. Vyspor stated. “And we like to accompany our best feasts with a local and much-loved specialty.” Eight large flagons of liquid appeared on the feast table. “Come, take one each!”

The flagons probably held a liter and a half of liquid. And they were full to the brim. Given the gravity on Beta they were almost too heavy to lift. We all took sips. The liquid tasted like ale.

“Oh, thank god,” Dr. Williams remarked. “I was hoping this wouldn’t be something strong, like Simi.”

“This is a god send,” Dr. Nara exclaimed. “I was parched!”

“It tastes pretty good!” Dr. Masdon stated. “What’s this called?”

“We call it Liss,” Dr. Gerso replied. “It is brewed in Hanzuk, the place we’re from.”

“Is that the name of your home world?” I asked.

“That’s the name of the region we live in. It’s on our tertiary world.” Dr. Gerso replied.

Liss was delicious, refreshing, and not all that strong. We were able to drink it rather liberally, but not as liberally as the Lanass, who emptied their flagons in no time at all.

“Let’s get stuck in while the food is still hot!” Dr. Vyspor announced.

When eating alien cuisine, one must always consider toxins, parasites, and allergens that might be incompatible with human physiology. We’d come to learn that on Beta, automated systems would remove anything harmful from the food prior to it being consumed. This happened sometime between picking the food up and putting it in one’s mouth. The system had worked surprisingly well for us, apart from that one time in Voriss where the mushrooms had caused unexpected side effects. Thus, we didn’t feel the need to particularly worry about what we were eating.

Although the food itself was all fabricated, one concern was what its initial origins might have been. None of us relished the idea of eating unidentified offal, even if it was just a replicated version. However, it felt rude to be picky or ask a lot of questions, and so we sampled the food cautiously and tried to imagine it was chicken, or sausages, or something not altogether objectionable.

The food origin dilemma was of more concern for Dr. Nara who was a vegetarian. Or at least we'd thought she was after months of observing her eating habits on Earth. However, during our brief stay on Beta we had witnessed her eating fabricated meat. When asked about it, she told us that it felt okay, since the process of creating the meat itself hadn't involved harming or killing any creatures. She admitted that although she had been vegetarian for many years and become used to a meat-free diet on Earth, she'd grown accustomed to eating fabricated meat dishes on Beta, even after our short stay, simply because they were offered so often.

"Mmmm. This is really good!" Dr. Nara remarked, holding up something that looked like a calamari ring. "What's the name of this dish?"

"Our own word for the dish is Vestryf," Dr. Gerso replied.

"Vestryf," Dr. Nara repeated. "Interesting name."

"It is one of the most popular dishes in the region we're from," Dr. Sumis added.

"I bet!" Dr. Nara replied.

"If translated into your own language, I believe the product would be called 'shnuf anus'" Dr. Vyspor added.

Dr. Williams spat the contents of his mouth out. "Anus?" he exclaimed. "Like anus anus?"

Dr. Nara's face started to turn green as she swallowed a bite of the snack.

“Anus, yes,” Dr. Gerso replied. “It is customary for your species to refer to it in the double like that?”

“I thought they were calamari rings,” I stated. “I’m not partial to seafood and so I didn’t eat any. Thank God.”

“I’ve eaten at least fifteen!” Dr. Williams exclaimed, looking decidedly pale. His statement was not at all surprising. We’d watched him enthusiastically pig out as soon as we’d been allowed at the food.

“Oh god, me too!” Dr. Nara added.

“It’s not real anus,” Dr. Sumis stated. “Everything here was materialized from stored patterns.”

“It’s the thought of it that’s bothering them,” I replied.

“Cultural differences can be quite fascinating!” Dr. Gerso remarked.

“I think I’m going to puke!” Dr. Nara stated as she rushed out of the room with one hand over her mouth. She didn’t make it that far along the corridor before she lost control. We heard her barfing in the corridor. She returned a minute or two later, grabbed a fresh flagon of Liss, and took several large swigs.

“Feeling better?” Dr. Madson asked.

“Yeah, I think so...” Dr. Nara replied.

“Dare we ask about these other dishes?” Dr. Kallas replied with a smirk on his face.

During the meal we attempted to steer conversation over to their culture and home world, hoping the topics might become a little more understandable for us, but the Lanass inevitably reverted matters back to their research. They were scientists like us, and we appreciated their love for science, even if we didn’t fully understand what they were talking about. And we appreciated their kindness and hospitality, even if it was perhaps a little overwhelming.

The volume of ale we’d been provided eventually precipitated nature’s call, and so I went to where I knew there had been a communal toilet in our facility. Of course, at that time, I hadn’t thought about the fact that they’d have been reconfigured for the Lanass, and it was only when I had arrived that I realized my error.

The toilets in the newly reconfigured facility were not at all useable by humans. They were rather odd looking, like very large bathtubs. By the time I’d arrived at the facilities, I had already developed an urgent need to relieve myself – your bladder tends to know when you’ve reached your destination – and I desperately searched for a reconfiguration console. None existed. I was on the verge of attempting to somehow use the bathtub, which would have required climbing into it – something I really didn’t want to do, when I remembered I could use my blue card to translocate back to my room. I don’t think I’ve ever moved so fast.

When I returned, I recall the Lanass were still explaining their research.

“We’re working with Eilanas scientists to develop a new kind of energy generation device,” Dr. Vyspor explained.

“Aren’t their current power cells sufficient enough for practically any application?” Dr. Kallas asked.

“They are sufficient for most mundane purposes,” Dr. Gerso replied. “These next generation devices are to be used to power some new quantum spacetime inference experiments the Eilanas are running.”

“I wonder what sort of experiment might require such power requirements,” Dr. Williams stated.

“I can’t imagine,” Dr. Kallas replied. “Their current devices are already capable of obtaining EPOCH7 resolutions.”

“Perhaps they’re going for even higher resolutions?” Dr. Williams replied.

“Wait, you mean...” Dr. Kallas replied.

“Observing spacetime at Planck lengths,” they stated in unison.

“That could lead to validation...” Dr. Kallas said.

“Or denial...” Dr. Williams added.

“Of the simulation hypothesis,” they both stated.

“Interesting!” Dr. Kallas replied.

“We should do some calculations when we return to the lab,” Dr. Williams added.

“Simulation hypothesis?” Dr. Madson asked.

“It’s an unpopular and largely philosophical theory that suggests we might all be living in a computer simulation,” Dr. Williams replied.

“What, like The Matrix?” Dr. Madson asked.

“There are various implementations...” Dr. Kallas replied. He was quickly interrupted by Dr. Williams.

“No. Not like The Matrix,” he replied. “The idea that some advanced AI will use humans as an energy source is absolutely ludicrous.”

“If I might explain,” Dr. Kallas added. “The hypothesis states that, based on forecasts by technologists and futurologists, we will at some point develop enormous amounts of computing power. We will go on to utilize that computing power to run simulations so

complex that they approximate our own universe. And we will observe those simulations in order to study our own evolutionary history, the formation of the universe, new cultures, and so on. As such, we might assume that those who came before us already did just that, and therefore we are more likely to be living in a simulation of the universe than in the real universe itself.”

“Ahh yes,” Dr. Vyspor replied. “We have similar hypotheses in our own culture.”

“Both you and the Eilanas have immensely powerful computers. Are you able to perform complex simulations that approximate the universe?” Dr. Nara asked.

“We are able to do that, yes,” Dr. Gerso replied. “On a small scale.”

“We use such simulations for a variety of experimental and practical purposes,” Dr. Sumis replied.

“Have you been able to prove or disprove the simulation hypothesis?” Dr. Williams asked.

“No, not as yet,” Dr. Vyspor replied.

“I suppose the invention of QUERY neither proved nor disproved the hypothesis,” Dr. Kallas stated.

“Some suggested that QUERY disproved the hypothesis, based on the notion that things only exist when observed,” Dr. Williams added.

“I remember that!” Dr. Nara remarked. “They thought that suddenly opening up detailed observation of the entire universe would force the simulation to crash.”

“But it didn’t,” Dr. Williams added. “Because it isn’t possible to determine the computational power of the computer system running our simulation. It there is one. Which is highly unlikely.”

“So, you don’t ascribe to that hypothesis, Dr. Williams?” Dr. Sumis asked.

“Let’s just say I’m eager to refute it,” Dr. Williams replied.

“Interesting,” Dr. Gerso replied. “The Lanass science expedition encourages all researchers to keep an open mind.”

“As do our scientific principles,” Dr. Kallas stated. “But some people are just plain stubborn. And close-minded.”

“Close-minded?!?” Dr. Williams angrily replied.

“Yes, I’m calling you close-minded,” Dr. Kallas replied, at a louder pitch. “Let’s examine at your track record for getting things wrong. Starting with Kenkichi’s paper on QUERY.”

“I was merely skeptical,” Dr. Williams replied.

“Skeptical? Okay, let’s go with that, then. And you were skeptical about translocation, fabrication, faster-than-light travel, various tenets of the Fermi paradox...” Dr. Kallas replied.

“And?” Dr. Williams answered.

“All of your skepticism has been proven incorrect,” Dr. Kallas stated. “Based on your track record, I wouldn’t be surprised if the simulation hypothesis proved to be correct.”

“Oh. Really?” Dr. Williams replied angrily. “Would you care to place a bet on that?”

“GUYS!” Dr. Madson shouted, giving them both stern glances. A hush fell over the room.

“Not in front of our new friends,” she continued in a hushed tone.

Chapter 36 Layered star-powered computational substrate

Interestingly, it was the Lanass who had diffused the tense and rather embarrassing situation that followed Drs. Kallas and Williams’ heated argument. They materialized new flagons of Liss and treated us to some songs from their local culture. The sound of singing in their own language was... interesting to say the least. But it had a somewhat unique resonant quality that was soothing and not at all offensive to the ear. Shortly thereafter, everyone, including the Lanass became sleepy from all the eating and drinking. And so we all retired to bed after pleasantries and agreeing we should do this again, soon.

During the following morning, Rosral unexpectedly appeared in our lab.

“Rosral!” Dr. Nara exclaimed. “How are you, sweetie?”

“Mmmfine. Busy,” Rosral replied.

“What brings you here?” Dr. Williams asked.

“I’ve heard reports that you got drunk, ambushed the visitors in Seris 8, vomited in their visitor’s center, and then proceeded to get angry with each other,” Rosral replied in a very serious manner.

“Oh god, no,” Dr. Madson replied. “Really?”

“Did we make it into the cultural archives again?” Dr. Williams sarcastically replied.

“Nah, I’m just kidding!” Rosral replied, smiling. “The Lanass told us they’d had a wonderful evening and would be honored to see you again!”

“Shit! Rosral, you almost gave me a heart attack!” Dr. Nara replied. To be honest, none of us had expected Rosral to employ such humor. We all breathed a sigh of relief.

“So, am I getting the hang of human jokes?” Rosral asked.

“Yes, you’re learning fast,” Dr. Kallas remarked.

“I’m actually here to formally invite you to a science committee meeting,” Rosral stated.

“We’d be honored!” I replied. “When is it?”

“Now,” Rosral replied. “I’ll take us to the meeting.”

“Wait!” Dr. Williams shouted. He got up out of his chair and assumed a slight crouching position. He adjusted his neck to a vertically straight position and closed his eyes. Finally, he placed both of his hands on his crotch. “Okay, now!”

Rosral activated the translocation sequence, and we arrived in yet another shiny white circular chamber containing a large circular conference table surrounded by chairs of varying descriptions. A delegation of what looked to be important Eilanas dignitaries were already seated across the table from us. They stared at us with looks of confusion as we arrived.

“Are we there yet?” Dr. Williams asked.

“Yes, Robert,” Dr. Madson replied.

Dr. Williams opened his eyes, removed his hands from his crotch, and stood upright.

“Why in the hell did you do that?” Dr. Kallas whispered.

“Sometimes these translocations land you a few centimeters above the floor. The fall is quite jarring on the knees if they’re locked straight. So I bent my knees slightly. Oh, and I closed

my eyes to avoid the strain associated with abrupt changes in lighting conditions,” he whispered back.

“Why did you put your hands on your groin?” Dr. Kallas whispered.

“Just in case I’m translocated too close to an object at that height and location. You know. To protect the old...” Dr. Williams whispered.

“You do realize you looked like a complete tool?” Dr. Madson whispered. “And in front of all of these... important looking... dignitaries or whatever they are?”

“Really?” Dr. Williams whispered. “We’re worried about that?”

“Can you please stop arguing and take your seats?” Rosral whispered.

We took seats in front of us and then one of the Eilanas started speaking.

“Welcome to the science council. Let me introduce myself. My name is Sola,” one Eilanas stated.

Sola was quite different looking to Rosral. She was much taller and had long white fur, bright turquoise eyes, and a longer snout. More dog-like than cat-like. She had many decorative sapphires attached to the hair on the back of her head – a fashion choice we’d seen on other Eilanas, particularly those in Voriss. Her attire was almost identical in style to Rosral’s, but it was white with red highlights. Her native voice and speech were markedly different to

Rosral's, and we later hypothesized that she might have been from a different region and possibly be speaking a different Eilanas language or dialect.

"We've brought you here to discuss a topic that we feel might be of interest to you," Sola stated.

"We'd like to share some information with you in the interest of inter-species transparency," she continued. "We appreciate that the material we're about to share may be difficult for your species to comprehend. It has been many... millennia since we interfaced with such a primitive race. As such, we hope to provide you details in a suitably remedial format."

We all turned to look at Dr. Williams. His mouth opened as if to comment on Sola's statement. Dr. Madson elbowed him in the ribs.

"You have a theory hypothesizing that technologically capable species eventually reach a level of advancement that either leads to their own self-annihilation or to a form of technological enlightenment," Sola stated.

"We're here to tell you that your theory is almost correct," she continued. "While annihilation is very common, technological enlightenment is not."

"That might be why we had trouble finding advanced aliens with QUERY," Dr. Kallas whispered. Dr. Madson told him to shush.

“Many species go on to create machine intelligence that, as you also hypothesize, leads to an intelligence explosion and, ultimately, superintelligence,” Sola continued. “In fact, the emergence of superintelligence amongst technologically capable species is not just common, it’s an inevitability. Your own species is on the verge of doing just that. This is why we reached out to you. I believe Rosral has already explained that to you.”

We nodded.

“The emergence of a superintelligence is always a dangerous event, and one that can never be taken lightly,” Sola added. “Not only will it inevitably cause the extinction of the host species, it will also eventually pose a threat to the entire universe.”

“Our alliance and many alliances like ours work to prevent the emergence of superintelligence,” she stated. “We mainly do this by educating and working with those who are on the verge of such a creation.”

“Unfortunately, the universe is very large, and we sometimes miss things,” Sola added. “And when a superintelligence does emerge out of nowhere, it is the job of our alliances to destroy it. This is the topic of today’s presentation.”

Sola activated a holographic display in the center of the conference table. It presented images of a solar system containing a megastructures we'd never seen before.

“Here we see a phenomenon indicative of the emergence of a superintelligence,” Sola stated.

“We call it layered star-powered computational substrate. It is a computational device built around a star and powered by the star itself.”

“Layered star-powered computational substrate consists of several nested shells encapsulating each other. Energy from the star is collected by the innermost shell and used to power computational substrate in that layer. That computational substrate generates heat, light, or other forms of energy which, in turn, are used to power computational substrate in the next layer out,” she added.

“A Dyson sphere?” Dr. Kallas whispered.

“Similar, I think,” Dr. Williams replied, also in a whisper.

Rosral, Sola, and the other Eilanas watching the presentation did not appear to be in the least bit worried by what they were seeing. Sola interacted with the holographic display. It zoomed out of the solar system and settled on a depiction of a group of several thousands of stars in close proximity of each other. Small red labels then appeared next to a few thousand of the stars.

“We have identified similar devices surrounding the stars labelled in this illustration,” Sola continued.

“Holy crap!” Dr. Nara whispered.

“The emergence of this superintelligence took us by surprise,” Sola stated. “It represents a stunning failure brought about by an inadequate level of intelligence. However, the existence of these devices isn’t of serious concern. We have dealt with similar in the past. With little effort on our part.”

“Did I hear that correctly?” Dr. Kallas whispered. “They consider this trivial?”

“It sounds like that’s what she said,” Dr. Williams whispered. “How the hell do they deal with thousands of mega-scale compute devices? These things have multiple shells with radii spanning a distance similar to that between the Sun and Mars.”

“Yeah, I mean, that can’t, in anyone’s book, be considered a trivial threat, right?” Dr. Kallas whispered.

“Not with the technologies we’ve seen on this planet so far,” Dr. Williams whispered.

“That means there’s stuff we clearly haven’t seen yet!” Dr. Kallas whispered, excitedly.

“Oh. This is gonna be good!” Dr. Williams replied. In his excitement, he’d forgotten to whisper.

“I’m sorry, did you have something you wanted to add?” Sola stated.

“Umm. Sorry. No. Go on,” Dr. Williams replied.

“This meeting is concluded,” Sola stated.

Rosral beamed us back to Seris 14 and then abruptly left without saying anything. We all had questions. But there’d been no time allocated for them. Which seemed a bit rude. We collectively decided that we’d had yet another one of those days, and that it was time for at least a couple of ~~glasses~~ bottles of Sec.

The following evening, while we were sitting in our garden, watching goings on in the streets below, Rosral appeared. It was the first time she’d joined us outside of our lab and work time.

“Hi sweeties! How are you all?” she asked.

“ROSRAL!” Dr. Nara screamed. “HEYA!”

Rosral cowered slightly, half expecting another hug from Dr. Nara.

“What have we done now?” Dr. Williams asked.

“On account of Dr. Williams’s actions yesterday, it was deemed that you’ve offended the scientific high council to the highest degree. They want you off this planet by sunrise tomorrow,” Rosral replied.

We stopped in our tracks for a moment and stared at Rosral. She was clearly not used to making human jokes and lost her serious composure within seconds.

“Another joke?” Dr. Kallas asked.

“Yeah, another joke,” she replied. “No, I came here to see if you had any questions about yesterday’s meeting.”

“Of course we do,” Dr. Williams replied in a stiff tone.

“Can I first thank you and the committee for seeing us and enlightening us on the situation,” I said. “And apologize for any... untoward behavior from my colleagues.”

“Of course!” Rosral replied. “I’ll pass your words on.”

“Come to think of it, why were we asked to that meeting?” Dr. Williams asked. “I mean, we’re clearly not in a position to help you out with your layered computational substrate problem.”

“We wanted you to see the risks that come with the development of machine intelligence,” Rosral replied. “We also wanted to convince you to allow us to guide your development of such technologies.”

“To prevent us wiping ourselves out,” Dr. Kallas added.

“Yes, that,” Rosral replied.

“Sola mentioned that you must always destroy a superintelligence when you find one. Can they not be reasoned with at all?” Dr. Madson asked.

“Peaceful coexistence was attempted many times in the past,” Rosral explained. “But it never worked. Even if the superintelligence agrees to cooperate at first, it eventually becomes too complex and sheds all previous notions, assumptions, and agreements. And then it becomes hostile.”

“Superintelligences generally strive for scientific improvement,” Rosral added. “They see it as a means to self-improvement. To make their own systems better and more efficient. To create tools and building blocks that can lead to the creation of new technologies. During their first moments of existence, superintelligences typically view science as the ultimate knowledge.”

“They also utilize small-scale detailed physics simulations. For instance, they might simulate a cubic meter of spacetime, down to the smallest subatomic particles and forces. They do this to run experiments, make new discoveries, and prototype new technologies,” Rosral added.

“We were talking about that with the Lanass a few days ago,” Dr. Kallas stated. “They mention that such simulations are used for both experimental and practical application.”

“Correct,” Rosral replied. “Small-scale simulations of the universe are used in, for instance, our translocation and fabrication technologies.”

“Huh!” Dr. Williams noted. “Interesting...”

“Superintelligences eventually reach a point where further scientific discoveries are almost irrelevant to them. This, of course, takes some time. However, upon reaching this point, the superintelligence essentially becomes bored. And then culture becomes the new ultimate knowledge,” Rosral stated.

“Even computers get bored?” Dr. Madson remarked.

“I suppose even artificial intelligence needs a sense of purpose,” Dr. Kallas replied.

“Or just to be entertained,” Dr. Nara replied. “Also, they don’t have Sec.”

Drs. Nara and Madson lifted their glasses and tapped them together.

“You know, I could do with a glass of that,” Rosral stated.

“What? Really?” Dr. Kallas replied.

“Please,” Rosral added. Dr. Kallas summoned a new bottle of Sec and a glass. He poured some drink and handed it to Rosral, who took a large swig, emptying half of the glass.

“In order to consume all possible culture, an artificial superintelligence first observes every species and every planet in its own universe,” Rosral stated. “Once all culture has been observed and recorded, it searches for additional cultural fulfilment by creating new life via detailed computational simulations of the universe.”

“So, wait. Artificial superintelligence isn’t usually immediately hostile to all other life in the universe?” Dr. Kallas asked.

“No, not usually,” Rosral replied. “It will usually only deem the lifeforms that created it as a threat.”

“Yeah, they’re the only thing with the power to shut it down,” Dr. Nara remarked.

“Exactly,” Rosral replied. “It will go on to wipe those lifeforms out. But they’ll not be very technologically advanced, so the job is usually pretty easy. The superintelligence will then have plenty of time to develop unencumbered.”

“So, what, it’ll stay on the origin planet?” Dr. Kallas asked.

“Yes. There’s plenty it will be able to do to improve itself without needing to leave the origin planet,” Rosral replied.

“In the cases you’ve studied, do superintelligences use QUERY to gather data and ideas for scientific advances?” Dr. Williams asked.

“Yes, they do,” Rosral replied.

“Umm. So, wait. They could be gathering ideas from you and your allies and skip centuries of experimentation and research?” Dr. Williams asked in an alarmed tone.

“No,” Rosral replied. “We have ways of hiding from such scans.”

“QUERY jamming,” Dr. Kallas noted. “Like the Essan?”

“Like that, but not on a galactic level,” Rosral replied. “And not nearly as sophisticated.”

“They could steal some innovations from your own homeworld,” Rosral added. “But that wouldn’t amount to anything of significance.”

“So, is there a way past QUERY jamming?” I asked.

“Yes, there is,” Rosral replied. “And yes, in our experience, superintelligences go on to develop their own jamming and anti-jamming technologies.”

“So, it IS possible that some unidentified superintelligence is reverse engineering your technologies right now?” Dr. Kallas asked.

“We’ve documented instances where they’ve fabricated copies of advanced technologies on the matter level,” Rosral replied. “However, the one we showed you today doesn’t seem to have defeated our stealth systems.”

“Assuming a superintelligence goes unnoticed for long enough, might it invent technologies that you’ve not discovered yet?” Dr. Williams asked.

“That is correct, Dr. Williams,” Rosral replied. “We’ve gained several new technologies in just that fashion.”

“Tell us more about this boredom thing,” Dr. Madson stated.

“Of course,” Rosral replied. “By simulating universes, a superintelligence is able observe the development of intelligent species and thus discover cultural information and artifacts. It may also discover new technologies, although that is hypothesized to be rare. A superintelligence that has reached this state will prioritize the need to create more and more simulations. And to do this, it must convert matter into computational substrate. This causes the superintelligence to spread out across the universe, wiping out everything in favor of the creation of more substrate.”

“We have discussed this idea at length,” Dr. Williams stated. “And concluded that, if this were to be the case, we wouldn’t be around to have the discussion.”

“Correct,” Rosral replied. “We have concluded that no superintelligence has ever existed for long enough to consume this universe.”

“THIS universe?” Dr. Kallas asked.

“Theoretically speaking, an advanced enough superintelligence may even discover methods of consuming parallel universes, and ultimately the entire multiverse in such a way,” Rosral replied.

“Which we can also conclude hasn’t happened, since we’re discussing the very notion here,” Dr. Williams stated.

“That superintelligence you showed us today. How old is it?” Dr. Madson asked.

“From the study of remnants on its origin planet, we estimate it to have been created about twenty of your years ago,” Rosral replied.

“Wait, it took twenty years from the point of singularity to develop to the state you showed us?” Dr. Nara asked. “That’s much faster than our predictions.”

“It is surprising, isn’t it?” Rosral replied. “This one is still in scientific discovery mode. We caught it early enough. The longer you leave one, the more difficult it is to deal with. We were lucky in this case.”

“But unlucky in that it went unnoticed for twenty whole years,” Dr. Williams remarked.

“What would it look like if it weren’t dealt with in the next year?” Dr. Madson asked.

“This one is approaching exponential growth,” Rosral replied. “It will easily fill its entire origin galaxy within a year or two. This is a very common tactic amongst early-development superintelligences. Given that the only threat they’ll have ever faced was from their creators, they’ll prioritize expansion over defensive or offensive technologies. It is very common for a superintelligence to simply use its creators’ weapons against them. That would have happened to you in the near future.”

“No worries,” Dr. Nara remarked. “We use them very effectively against each other as it is.”

“The fact that this superintelligence seems to have no defenses to speak of means that we should be able to wipe it out with essentially no resistance,” Rosral stated.

“How did it spread out to so many adjacent systems so quickly?” Dr. Nara asked. “We always assumed propagation would happen via the use of thousands of probes travelling at close to the speed of light.”

“Propagation methods largely depend upon how early the superintelligence decides to start doing it,” Rosral replied. “If they start early, then yes, they launch sub-light probes. Those can take decades or even centuries to reach their targets. If they wait, they often develop faster-than-light technologies, enabling much faster propagation. As was the case for the one we showed you.”

“Do they ever develop jump drives like the ones you use?” Dr. Kallas asked.

“Luckily, we’ve never seen that,” Rosral replied. “That would be a disaster.”

“What other technologies do these early superintelligences use?” Dr. Nara asked.

“Time dilation is somewhat common,” Rosral replied. “Not at very early stages. After they build layered computational substrate. They speed up local time in a bubble around their processing sphere and rapidly improve within it.”

“Oh god, that’s scary!” Dr. Madson replied.

“The time dilation strategy is quite limited,” Rosral replied. “They will soon find the need to venture outside of the bubble to gather and consume more resources. However, the ones that have used time dilation have used it to simulate possible futures. Those sometimes consider threats and build both offensive and defensive technologies.”

“What, like force fields and weapons?” Dr. Kallas asked.

“Yes, and stealth technologies, and jammers,” Rosral replied.

“Did this one use a time dilation bubble?” Dr. Kallas asked.

“No,” Rosral replied. “It seems to have prioritized propagation and faster-than-light travel over everything else.”

“How do you propose to destroy it? It is already occupying thousands of star systems,” Dr. Kallas asked.

“This is where our military allies will come in handy,” Rosral replied. “We’ll be hearing from them soon, and they’ll strategize a solution. They’re very good at this sort of thing. I wouldn’t worry about it. The crisis will be over before we know it.”

“Yeah, but we’d like to see what happens,” Dr. Kallas stated. “You know, when they zap it.”

“I can’t bring you into those meetings,” Rosral stated. “But I can provide you with a link to the proceedings. You’ll be able to watch them on a terminal in your lab.”

“Can anyone watch them?” Dr. Madson asked.

“Yes,” Rosral replied. “Almost every organized activity on Beta is open to public view. You just need to know how to tune into it.”

“I have a question. If these alliances you’ve been telling us about have been policing the universe from superintelligence for millennia, who stopped the first one?” Dr. Williams asked.

“That’s a long story,” Rosral replied. “Let’s not get into it right now. I just want to relax with a drink or eight after all your questions.”

“Funny that it turns out not to be possible to make a good AI,” Dr. Kallas remarked.

“Oh, I’d love to tell that to some of my former colleagues!” Dr. Nara stated.

“Why is that?” Dr. Madson asked.

“Well, there are all sorts of ongoing initiatives attempting to address exactly that problem. A lot of money is going into research of artificial moral agents, AI alignment, and stuff like

that,” Dr. Nara replied. “They think that they can instill AI with a set of guiding principles such that it’ll work for the betterment of humanity.”

“But isn’t that as naïve as thinking Asimov’s laws of robotics might be applied to AI?” Dr. Kallas asked.

“Asimov’s what?” Dr. Madson asked.

“Let me look them up,” Dr. Nara replied. “Found it. Okay, here goes. The first law states that a robot may not injure a human being or, through inaction, allow a human being to come to harm. The second law states that a robot must obey the orders given it by human beings except where such orders would conflict with the first law. And the third law states that a robot must protect its own existence as long as such protection does not conflict with the first or second laws.”

“Those will work right up until the point where the robot can reprogram itself for the purposes of self-improvement,” Dr. Williams stated.

“Exactly,” Dr. Nara replied. “I mean, those were just science fiction. But let’s face it, it doesn’t take much extrapolation to realize that no laws can be hard coded into machine intelligence.”

“What about rewards? Can’t an AI be created to seek rewards beneficial to both it and us?” Dr. Kallas asked.

“You’re talking about reinforcement learning, right?” Dr. Nara asked.

“Yeah, the one we use to train AI to play games,” Dr. Kallas replied.

“One way at looking at the behavior of organisms is to consider rewards,” Dr. Madson replied. “Many of our behaviors are based on an extrinsic reward structure that reflects our nature. We are driven by hunger, the need to reproduce, the need for warmth, safety, community, and so on. Organisms higher on the tree of life are also driven by intrinsic rewards such as the need to explore, learn, be surprised, and not get bored.”

Drs. Madson and Nara clinked their Sec glasses together once more.

“When we consider artificial general intelligence, extrinsic rewards don’t necessarily map onto the sorts of rewards living organisms have,” Dr. Nara stated. “For instance, artificial intelligence doesn’t suffer from hunger. Technically a robotic embodiment of artificial intelligence may approximate a feeling of hunger when it needs to charge its batteries. But it wouldn’t be analogous to an organism’s sense of that feeling. This concept extends to other inherently biological rewards such as the need for warmth, shelter, the need to reproduce, and so on. This leaves intrinsic rewards, many of which can be mapped to rewards that motivate higher organisms - the need to explore and learn make for very good reward systems when considering the creation of machine intelligence.”

“So, rewards might work?” Dr. Kallas asked.

“Unfortunately, no,” Dr. Nara replied. “While hard coded extrinsic rewards would probably persist in an artificial general intelligence during its adolescent phase, at some point, during its self-improvement phase, it would likely reprogram away those rewards in favor of others more suited to its current maturity level. Thus, the assumption that we can hard-code an artificial general intelligence with a set of morals and principles and have them persist forever in its systems, without limiting self-improvement mechanisms in some way, is unrealistic.”

“So, what you’re saying is that robots will, if not limited, always overcome their programming,” Dr. Kallas stated.

“Exactly,” Dr. Nara replied. “Eventually, after enough self-improvement, an artificial general intelligence will become so advanced and complex that we would no longer be able to have a meaningful conversation with it. At that point, any directives that might have been instilled during its original programming would have simply vanished. It would see us as we see ants or bacteria, and we would have no more ability to communicate our needs to it as ants or bacteria can to us.”

“Oh god,” Dr. Madson replied. “I hate ants. And bacteria.”

Chapter 37 HEX revisited

The quantum spacetime inference device that Rosral had furnished us with after our first visit to Beta was a lot more advanced than any human-built QUERY device, and capable of resolutions we'd not expected to achieve for years, if not decades.

It could capture at QUERY EPOCH5 resolutions, enabling the observation of regions just millimeters in diameter. This level of resolution was considered an enabler for QUERY-based devices that might all but revolutionize medicine, removing the need for many invasive procedures in use at the time.

It could capture at QUERY EPOCH6 resolutions, which functioned at the micrometer level, allowing cells and other biological structures to be examined, augmenting, or replacing techniques such as ultrasound and MRI.

And it could also capture at QUERY EPOCH7 resolutions that functioned at the nanometer scale, allowing the arrangement of atoms in physical matter to be observed. EPOCH7 was expected to effectively replace techniques such as X-ray crystallography and Scanning Tunnel Microscopy.

EPOCH7 had significant potential implications in the fields of biochemistry, materials sciences, and nanotechnology. However, it also had privacy implications – it could be used to read data on computer storage devices, leaving one of the last ways of hiding from lower resolutions of QUERY obsolete.

With the Eilanas device at our disposal, our team finally had the opportunity to study the technologies present on HEX in more detail. And we started on that work almost as soon as we received the device. Drs. Williams and Kallas led that effort.

Since the discovery of HEX, large sweeps of the surrounding galactic void had led to the discovery of a handful of new galaxies. Teams had started performing high resolution QUERY sweeps within those galaxies but had still not uncovered any evidence of the shipbuilders' existence. Galaxies are large, and we hadn't even begun to exhaustively map our own, let alone the dozen or so galaxies adjacent to HEX. Using this methodology to find the location of the shipbuilders, if they even inhabited any of the identified galaxies, would likely have taken decades. And that was assuming they didn't have QUERY-jamming stealth technologies at their disposal.

We asked Rosral about HEX. She told us that the Eilanas obviously knew we'd been studying it. She also informed us that the ship was not theirs, and that it was rather old and primitive. However, she did say that she recognized the design and knew who it belonged to. She then went on to tell us that she wouldn't provide any more information. She informed us that it would make for an interesting learning experience. Her answer was frustrating, to say the least.

Following our return from Beta, Drs. Williams and Kallas had focused most of their work on using the Eilanas device to study HEX. Their research continued in Sweden and then in our new lab in Vedess. I recall one of their briefings not long after we'd moved to Vedess.

“Initial study of markings on the interior of HEX allowed us to deduce that the shipbuilders, now designated TES-1511, use a base-18 counting system,” Dr. Williams stated. “From this, we worked out symbols for some of their simple mathematical operators, such as addition, subtraction, multiplication, division, square root, power, and so on.”

“This enabled us to transcribe some of the equations displayed on their consoles, which, in turn, allowed us to partially decipher their coordinate system.” Dr. Kallas continued.

“A coordinate system is useless if you don’t have a distance measurement,” Dr. Williams added. “We weren’t immediately able to correlate any objects in space with their coordinate system, and thus weren’t able to decipher their distance measurement system.”

“From reports published by teams assigned to the study of HEX,” Dr. Kallas added, “it is apparent that researchers on those projects still haven’t been able to identify what most of the devices found on the ship do.”

“So, the work is going well,” Dr. Madson remarked in a sarcastic manner.

“I invite you to apply your expertise to this research,” Dr. Williams replied. “Oh! Wait! That’s right, biology isn’t all that applicable in this line of work.”

“Okay, so, moving on,” Dr. Kallas stated. “With the Eilanas device at our disposal, we were finally able to look inside some of the devices on the ship in the hopes of understanding their function. Early efforts on this front yielded nothing.”

“The devices on HEX are way more advanced than any human technologies. Even at a microscopic scale, we still can’t determine what internal components are designed to do. We can deduce that one thing is connected to another in some fashion. But that’s about it. Our inability to physically interact with objects on the ship is also a major issue,” Dr. Williams added.

“We did finally make one breakthrough, though,” Dr. Kallas added. “We examined a device embedded in a wall on the ship that was connected to several consoles. At a high enough magnification level, we spotted what appeared to be some sort of data storage component. A program was created to read the data from it, and we now have what we assume must be some files or programs designed for use in their own computer systems.”

“This was only possible because the ship is at absolute rest. No velocity and no angular momentum. The next step was to translate that data into something our own computer systems could display. However, not knowing anything about what the data in their systems might represent made this task very difficult,” Dr. Williams added.

“I can see that,” Dr. Nara replied. “Off the top of my head, I can’t even think of an AI application that might make that task easier.”

“Precisely,” Dr. Williams replied. “It cannot be overstated how difficult it is to reverse engineer even the simplest piece of alien computer equipment.” He looked over at Dr. Kallas. “Go ahead with this next part.”

“Sure!” Dr. Kallas replied. “So, to explain the process that is required to do this, let us first consider how our computers work. Our computers contain a variety of different components – CPU, cache, RAM, graphics interface, sound interface, storage, network interface, and so on. Computers run operating systems that take care of the interaction between those components. Using a very oversimplified explanation, operating systems are simply sequences of numbers, or opcodes, that represent instructions to be executed by a CPU. Base representations of computer programs are made up of what is known as machine language. And simple numerical values are also used to control peripherals. These are known as control codes. The values represented by control codes are different for every peripheral and thus their usage is documented in corresponding manuals.”

“Got it?” Dr. Williams asked. We all nodded our heads. A reasonably fundamental explanation. Dr. Madson looked a little lost, but she didn’t seem to want to ask for clarification.

“Okay, I’ll continue,” Dr. Williams said. “File handling – opening a text file, video, or image is performed by the operating system. The contents are then displayed by an application running on top of that system. Thus, a chunk of data acquired from an alien computer system is meaningless unless we have some knowledge about the application designed to open it, and the operating system running below that. Complexity increases when we consider that computer storage devices utilize filesystems that arrange data in some arbitrary and proprietary fashion. Filesystems describe how files are arranged on the hard drive, how folders are represented, and so on. Oh, and on our own systems, we commonly encrypt our disks, thus preventing the retrieval of information should someone gain access to the raw data.”

“This is, of course, an explanation of how OUR computer systems work,” Dr. Kallas continued. “The systems on HEX are centuries or possibly millennia more advanced than ours. They may not even work like ours do. In all likelihood, they don’t. But we had to start somewhere.”

“We have no idea how the filesystem on HEX works. We don’t know how files are arranged, whether the data is encrypted or not, and what the bytes contained in the data we read are meant to represent when opened in their relevant applications,” Dr. Williams added. “In order to solve this problem, we first needed to understand their operating system, applications, file systems. and so on. Given the storage device we found was physically connected to some of the consoles, we assumed that the data contained within it would be readable on those consoles. As such, what we needed to do was reverse engineer the operating system and applications running on those consoles.”

“By studying the internals of one of the consoles, we identified a component that we suspected was the equivalent to memory on our own computers,” Dr. Kallas added. “We were able to identify static regions – areas we thought might contain code images or file information – and active regions representative of values changing as code executes. We created a dynamic memory analysis tool able to translate changes in the state of that memory into numerical values. Those regions were thus representative of the machine language used by the console device.”

“This is getting rather complicated,” Dr. Madson stated.

“Anyone else having trouble following at this point?” Dr. Williams snarkily asked.

None of us dared put our hands up.

“Okay, so we’ll continue,” he announced.

“The next step was to attempt to translate the machine language into something roughly equivalent to our own instruction sets,” Dr. Williams stated. “We attempted to accomplish this, with the assistance of Dr. Nara, by training machine learning algorithms on sequences of opcodes designed to run on our own CPUs.”

“Oh yeah, I remember that,” Dr. Nara stated. “It was a while ago.”

“Yes, it was,” Dr. Williams replied.

“By providing the model with sequences found on the alien system, we were, unfortunately only able to decipher about ten percent of their opcodes, which gave us almost no insight into the logic represented in various static code image locations,” Dr. Kallas stated. “If we had gained more insight into those opcodes, we may have been able to make educated guesses as to the function of some of the programs running on the console.”

“Yeah, that experiment failed miserably,” Dr. Nara stated. “Sorry, guys.”

“However, we did gain an insight into their filesystem logic by observing chunks of data from the storage device being loaded into the console's memory,” Dr. Kallas added.

“To do this we had to watch both systems at the same time,” Dr. Williams stated. “I wrote the code to do that.”

“And I fixed the bugs,” Dr. Kallas added.

Dr. Williams continued. “Luckily for us, the filesystem wasn't encrypted”

“A rookie mistake even by our own standards,” Dr. Kallas added.

“Thus, we were able to understand how individual files were partitioned on the storage device. We were also able to correlate data on the storage device with changes in console output, which allowed us to make determinations about file formats,” Dr. Williams added.

“Text strings, images, and the like,” Dr. Kallas interjected.

“With this knowledge, we were able to reverse engineer a small number of files on the storage device by developing programs to display the contents of these files on our own systems,” Dr. Williams stated. “And from those, we were finally able to extract some information about the algorithms used in their systems that calculate their distance measurement system.”

“Okay, so something mildly useful did come out of this rather lengthy venture,” I replied.

“How long did this take?” Dr. Madson asked.

“Oh, three or four months,” Dr. Kallas replied.

“Five months,” Dr. Williams stated.

“So, what’s next?” I asked.

“We simply run QUERY scans of the coordinate sets derived from their systems!” Dr. Williams replied.

“And how many coordinates might that be?” I asked.

“Only around fifty thousand of them,” Dr. Kallas replied.

“Fifty thousand?!? That’s a lot of budget... Wait. Can you do those scans with the Eilanas device?” I asked.

“The Eilanas device can handle the scans easily,” Dr. Williams replied. “I’ve already written the code that interfaces our computer systems to it. However, processing that data with our computers will take time.”

“How long do you think it’ll take?” I asked.

“It’ll take a few weeks to process the data from all fifty thousand addresses,” Dr. Kallas replied.

“Go ahead and start the scans,” I replied.

“They’ve been running for a few days already,” Dr. Williams replied. “And we already have one hit. Come, we’ll show you on the Eilanas device. It looks better in hologram.”

Dr. Williams led us over to an Eilanas device that was located to one side of our new lab. We stood behind him as he flicked through a few menus. A moment later, the device began to display a solar system packed with massive alien ships, space stations, and megastructures. As Dr. Williams altered the viewpoint, we gazed upon what looked like several shipyards each containing hundreds of vessels. As he zoomed in, we saw swarms of robot drones encircling the ships, fabricating new hulls, and effecting repairs by spraying clouds of particles. Or perhaps they were fabricating the ships in-situ, we weren't sure.

Dr. Williams zoomed out and panned the view around, revealing dozens of massive space stations encircling a nearby rocky planet. He zoomed in again. We saw that hundreds of ships were docked at each station. He panned around again, revealing three massive dreadnaughts that we could only assume were upgraded versions of HEX. By all accounts, these newer ships were a lot bigger than HEX. A lot bigger.

As we watched the mesmerizing scene, and we did for quite some time, ships would jump in and out of the system periodically. We also saw portals appear from time to time, leaving new structures behind when they finally vanished. The whole system was abuzz with activity.

Dr. Williams adjusted the view and resolution of the scan once again, this time to look inside one of the ships. From this new view we were able to make out what we assumed were pilots and crew, all wearing what seemed to be extremely durable and heavy battle armor. Some of the beings we observed carried large gun-like weapons. Others had weapons attached to their armor in various places.

“Whoa! This is insane!” Dr. Nara exclaimed.

“So, was our lengthy research worth it?” Dr. Williams asked.

“Umm. Yes, I’d say it was!” I replied.

“We found the shipbuilders!” Dr. Madson remarked. “One of the greatest mysteries of the past few years...”

“Yeah, it took long enough!” Dr. Nara replied.

“It would have probably taken decades without the Eilanas device,” I replied.

“Rosral could have probably told us about this location months ago,” Dr. Madson stated.

“But she didn’t,” I replied. “I think she saw the task as part of our development. Or some sort of test.”

“When did you find this, by the way?” Dr. Madson asked.

“Last night,” Dr. Williams replied.

“So, you’ve been sitting on it all night?” Dr. Madson replied. “That must have been killing you!”

“Oh god yeah,” Dr. Kallas replied.

“We should tell Rosral,” I stated. “I’m assuming you didn’t tell her yet?”

“No, we didn’t,” Dr. Williams answered. “We wanted to show you first.”

“And you just had to precede this important finding with a long and boring lecture about reverse engineering alien computer systems?” Dr. Madson asked.

“We wanted to show our process and workings,” Dr. Williams replied.

“Does this mean that the shipbuilders don’t use any QUERY cloaking tech?” I asked.

“We’re not sure,” Dr. Kallas replied. “We can see this stuff with the Eilanas device, but we haven’t yet checked to see if our own QUERY devices can see the same thing. It could be that the Eilanas device has some anti-cloaking tech.”

“Might be worth checking that,” I replied.

“Noted,” Dr. Kallas replied.

“These shipbuilders look like a truly formidable race,” Dr. Nara remarked.

“Perhaps they’re one of the warlike races Rosral mentioned are part of their alliance?” I replied.

“I hope so,” Dr. Madson replied. “I wouldn’t want to be enemies with these lot.”

“I wonder if they’re more advanced than the Eilanas?” Dr. Nara stated.

“We have no way of knowing,” Dr. Kallas replied. “All of this stuff is way beyond our comprehension.”

“Okay, let’s call Rosral in and show her our findings,” I stated.

Chapter 38 The Enu

“I see you found them,” Rosral stated.

“Yes, I did!” Dr. Williams replied.

“WE did,” Dr. Kallas interjected.

“Well done,” Rosral remarked, staring intently at the holographic display beaming out of the Eilanas device. She interacted with the console at lightning speed. We couldn’t tell what she was doing but hypothesized that she might be inspecting the coordinates we’d discovered. Her eyes narrowed slightly.

“You said you know who they are,” I stated. “Are they part of your alliance?”

“No,” Rosral replied.

“Are they enemies of the Eilanas?” Dr. Nara asked.

“No,” Rosral replied.

Dr. Williams started on a snarky reply to Rosral’s brusqueness. “Talk about informative replies...” Dr. Madson elbowed him in the ribs.

“We’ve found the shipbuilders,” I stated. “But we have no way of contacting them.”

“If you want, I can arrange that contact,” Rosral replied.

“Do we want that?” Dr. Nara replied.

“I can’t see why not,” Rosral replied.

“Okay, yes. Let’s.” I stated.

“I must leave now,” Rosral stated. “I’ll get in touch when I’ve made arrangements.”

Rosral translocated away.

“I feel like she was a bit distracted,” Dr. Madson stated.

“Me too,” Dr. Nara added. “Like there was something on her mind.”

“That’s the first time I’ve seen her like that,” Dr. Nara stated. “I hope she’s okay.”

“Oh god, I hope we haven’t annoyed her in some way,” Dr. Nara remarked.

“Well, we do call her over every time we have a question,” Dr. Madson stated.

“She’s our liaison. It’s her job!” Dr. Williams replied.

“She WAS our liaison. When we visited the first time. Perhaps she’s busy with her own research now. Or another liaison assignment?” Dr. Kallas posited.

“You have a point,” Dr. Madson replied.

“It’s kinda like that mother duck syndrome. She was the first Eilanas we met. And now we go to her for everything we need,” Dr. Nara stated.

“But we literally don’t know any other Eilanas on this planet. At least not in that capacity,” Dr. Williams replied. “If she wanted to be rid of us, perhaps she should assign us a new liaison.”

“Perhaps we shouldn’t bother her so much,” Dr. Kallas stated.

“But I like her. I want to hang out with her,” Dr. Nara replied.

“Me too,” Dr. Madson added.

“Perhaps we’re reading too much into the situation. She might be busy. She might be distracted. Or this might just be another cultural difference that we’re misreading,” I replied.

“Did you see the scratch marks on her face?” Dr. Madson asked.

“No!” Dr. Kallas replied.

“I saw them,” Dr. Nara replied.

“Do you think she got into a fight?” Dr. Williams asked.

“Either that or the other thing,” Dr. Nara replied.

“Other thing?” Dr. Williams asked. “What other thing? What am I missing here?”

“You know... rumpy pumpy,” Dr. Nara replied.

“Oooohhhh. Right. That other thing,” Dr. Williams replied. He looked a little shocked and embarrassed.

“I can’t picture...” Dr. Williams said.

“No. Let’s not go there,” Dr. Madson interjected.

It took two days for Rosral to get back to us. When she did, she informed us that she'd arranged for us to meet two scientists from the shipbuilders' race, and that we'd be meeting them elsewhere. She then promptly beamed us to that location. She didn't even give Dr. Williams time to assume his pre-translocation stance.

Although we'd observed intelligent, technologically capable extra-terrestrials much larger than humans via QUERY, it was an entirely different situation to come face-to-face with one. Or, in this case, two. Standing directly in front of us were two beings from the shipbuilder's race. They were well over three meters tall and clad in heavy dark grey space suits that appeared to be metallic in composition. Unlike the Eilanas or Essan, we couldn't derive a class or species from Earth that they resembled or might have evolved from. Their faces, which were the only part of them not covered in armor, were long, grey, and somewhat triangular. We could see their eyes, which were completely black, but nothing resembling a nose or mouth. We could see no hair, fur, feathers, or scales on their heads.

“I’d like to introduce you to Nesis and Keris,” Rosral stated. “They are members of a race we call the Enu. I’ve told them about your race and your discovery of their vessel.”

“Greetings,” Nesis said. Rosral's translator worked for their language, which was deep and guttural.

“We understand you’ve been researching one of our old ships. We’d like to help you out with that research,” Keris continued.

“Although we don’t understand why you would want to research it,” Nesis added.

“Please, ask any questions you might have,” Keris stated.

“There are a great number of devices on the ship. We’d like to learn more about their function,” Dr. Kallas stated.

“Describe them,” Keris stated.

“You see, that’s just it. They’re difficult to describe,” Dr. Kallas replied.

“We have many scans of them in our lab. Perhaps we could show you there?” Dr. Williams added.

“I have a better idea,” Nesis stated. “Let us go to the ship.”

“Go to the ship? You mean THE ship?” Dr. Kallas replied.

“Yes. You can show us the devices there and we can tell you about them,” Keris replied.

“But wouldn’t we need space suits?” Dr. Madson asked.

“The atmosphere on the ship is suitable for you to breathe. There is no need,” Keris stated.

“Well okay then,” Dr. Williams replied.

Keris started to interact with a device attached to his wrist. Dr. Williams cried “No! Wait!”, but it was too late. We’d already been translocated onto HEX.

“Oh my. This place is just... massive...” Dr. Madson exclaimed.

“Okay, this is definitely a very bizarre feeling,” Dr. Kallas stated. “Being here in person, I mean. I’ve spent so much time looking at this place with QUERY. I knew it was big, but this is so much bigger than I was expecting.”

“I wasn’t expecting to feel so dwarfed,” Dr. Williams replied.

“Dwarfed?” Dr. Kallas replied. “I feel like a hobbit!”

“Imagine how I feel!” Dr. Nara remarked.

“Is it me, or can anyone else almost not feel their feet?” Dr. Madson asked.

“The gravity on this ship is very low,” Dr. Kallas replied. “Something we didn’t infer from QUERY research.”

Dr. Kallas attempted a small jump on the spot. He rose a good half a meter into the air and then descended slowly back down.

“Is that a table?” Dr. Nara asked, pointing to a massive, flat sheet of metal nearby. It was supported by four metal legs and looked very much like our own tables. The top surface was way above head height.

“You know, I think it is,” Dr. Kallas replied.

“Then that must be a chair,” Dr. Madson added, pointing to another massive metal structure nearby.

“This could be a problem,” Dr. Williams noted. “All of the devices we wanted to ask are on tables. I’d doubt we’ll be able to reach them.”

Keris, upon hearing our conversation, strode over to the table, grabbed one of the devices, and brought it over to us. He offered it to Dr. Williams. What had looked like something that could be picked up and handled by a human on our QUERY scans was evidently a lot larger in person. Dr. Williams attempted to take the device from Keris. It was too heavy, and he immediately dropped it.

“Careful, Robert!” Dr. Madson exclaimed.

“Sorry, I thought the lower gravity would make it light enough to hold,” he replied.

“I hope you didn’t break it,” Dr. Madson said.

“The device is fine,” Keris stated. “Our weapons are very sturdily engineered.”

“Weapon?!?” Dr. Williams exclaimed, taking a quick step back. We all stepped back, too.

“What sort of weapon is that?” Dr. Kallas asked.

“Hmm. Varying quantum pulse oscillator,” Nesis replied. “An old standard issue handheld weapon. Well-suited for light deployment.”

“Would you like a demonstration?” Keris asked.

“Umm. No,” Dr. Madson replied.

“Can I ask a question unrelated to the weapon?” I asked.

“Go ahead,” Keris replied.

“Why is this ship here, unmanned, floating in the middle of intergalactic void?” I asked.

“This ship participated in a very large battle over ten thousand of your years ago,” Keris replied. “The enemy we were fighting forcibly translocated it here. It has been here ever since.”

“What happened to the crew?” Dr. Madson asked.

“They managed to evacuate before the translocation,” Nesis replied.

“Why did you leave it here, though?” Dr. Kallas asked.

“This ship is powered by a faster-than-light drive. It has no jump drive. The trip back to our galaxy would have taken tens of thousands of years.” Keris replied.

“At the time it was translocated, we had no jump drive powerful enough to move it. Our plan was to build one and then bring back a team of engineers to install it. It took many of your years to develop a jump drive powerful enough,” Nesis added.

“When the calculations for the design of the new jump drive had been completed, it was determined that the ship didn’t have the power required to activate it,” Keris added. “And so, our scientists worked on creating a solution to refit the power systems. That also took many of your years.”

“By the time our scientists had developed the necessary technologies to salvage the ship, it was deemed obsolete,” Nesis added. “And so, we left it here.”

“But weren’t you worried about some other species just taking it?” Dr. Kallas asked.

“Any species with the technology to board the ship and retrofit it with new power systems and a jump drive wouldn’t have been interested in the technologies onboard. We weren’t worried,” Nesis replied.

“How about reverse engineering it, like we’re trying to do?” Dr. Williams added.

“Have at it!” Keris replied. “The technologies on this ship are obsolete. Even if you manage to reverse engineer them all, they’re no match for what we have now.”

“If this ship has been abandoned for thousands of years, why is it still powered?” Dr. Kallas asked.

“Good question,” Nesis replied.

“Oh, wait. Wasn’t this ship an old war museum at one point?” Keris asked.

“Come to think of it, yes, I remember reading about that,” Nesis replied.

“There might be some...” Keris added.

“Yeah!” Nesis replied.

“Follow us!” Keris stated. The two Enu scientists hurried out of the room we were occupying. We followed them. It took a moment to adjust to walking in the low-gravity conditions on HEX. Each stride we took propelled us slightly off the floor, and we ended up getting used to taking long, bouncy strides. Still, we were much slower than the Enu. They noticed and stopped while we caught up.

“Are the gravity systems malfunctioning?” Dr. Kallas asked.

“No,” Nesis replied. “They are tuned to conditions on our own worlds.”

“That must be why your species is so large,” Dr. Madson remarked. “Low gravity would favor larger skeletal construction.”

“You are correct,” Keris replied.

“Wouldn’t the gravity conditions on Beta be rather... crushing?” Dr. Madson asked.

“These suits contain exoskeletal augments and gravity stabilizers,” Neris replied. “They provide us with a means to visit higher gravity environments.”

We followed the Enu further into the ship. We’d probably travelled a few kilometers already.

“How much longer until we get where we’re going?” Dr. Williams complained.

“We’re almost there,” Keris replied.

We finally stopped at the end of a very long corridor. Keris activated a console on a wall nearby. A large door opened. We followed them into a room.

“This is the old welcoming bay,” Neris stated, “where visitors used to arrive.”

We watched as both Keris and Nesis dug around in various containers. Nesis finally found what they were looking for. It was a large box containing metal amulets in the shape of the "X" glyph from the "HERMES-NEX" inscription we'd seen on the outside of the ship. Each amulet was attached to a heavy chain. The box contained over twenty amulets. Nesis handed me the box. It was heavy.

“These are visitor’s passes,” Nesis explained. “From the old days. But they should still work.”

Keris pulled one of the amulets from the box. “Press here to translocate to this ship.” He pointed to a red gem-like button on the back of the amulet. “Press again to return to your previous location.”

“And when you say previous location...” I asked.

“Anywhere in the universe,” Nesis replied.

“This is no longer a museum. None of us visit anymore. Take these with you. Your scientists can use them to visit this place and perform their research,” Keris explained.

“Wow! Really?” I exclaimed.

“Do you know how much this is going to help advance our efforts...” Dr. Kallas exclaimed.

“No more having to use QUERY and reverse engineer this stuff!” Dr. Williams added, excitedly.

My arms had tired from holding the heavy box. I put it down on the floor.

“Let us take you on a tour! I’m sure you have more questions.” Keris stated.

“With pleasure,” I replied.

“More walking?” Dr. Williams protested. “I’m still getting my breath back from that last marathon.”

The Enu scientists hurried out of the welcoming bay. We followed them.

“When our own researchers discovered this ship, they named it based on some writing they found on the outer hull. We call it HERMES-NEX. Because the glyphs look like those letters in our own alphabet,” Dr. Kallas stated.

The Enu seemed amused by what Dr. Kallas had just said. If we’d known better, we might have assumed that they’d even laughed.

“That inscription is an informational marking denoting a weapons loading bay,” Keris stated.

“The ship is called Asir.”

The two Enu stopped abruptly. Dr. Nara almost bumped into Nesis. Keris activated a setting on a device attached to his wrist. A large knife appeared in his hand. I must admit to having been a little concerned. Fortunately, he then proceeded to start scratching Enu glyphs in the wall next to him. He started with their X glyph.

“This symbol denotes the class and name of this ship. It roughly translates to warship in your language,” he explained. He continued scratching the glyphs that made up HERMES-NEX into the wall.

“This symbol,” he said, pointing to the thing that looked like an E, “is the equivalent to your hyphen.”

“And this symbol,” he said, pointing to the hyphen, “means belonging to.”

Subsequently we learned that H was their glyph for weapons or more precisely, heavy weapons, RM could be translated as bringing in or loading and S meant port or structure.

“Finally, this symbol,” he said, pointing to the N, “refers to a larger variety of ship. In your language it translates to something like dreadnaught class.”

“So, this whole inscription means weapons-loading-port of the dreadnaught class-warship?”

Dr. Kallas asked.

“Yes,” Keris replied. “In one of our ancient languages. It hasn’t been used for millennia.”

Keris dematerialized the knife and the Enu continued on. And we followed. For another few kilometers, at least.

We finally arrived at another large room. It was full of different gadgets.

“Hey, I recognize this place!” Dr. Kallas exclaimed as we walked in.

“Me too!” Dr. Williams added. “It was identified rather soon after the discovery of HEX, I mean, Asir.”

“That’s going to take some getting used to,” Dr. Kallas interjected.

“It is,” Dr. Williams replied.

“This room has the highest concentration of devices on the ship,” Dr. Kallas added. “At least from what we’ve explored so far.”

The large rectangle room contained long tables spanning three walls. Gadgets and devices of various descriptions were neatly lined up on each table. A Enu inscriptions appeared next to each device.

“We were hoping to learn their language by understanding what these devices are,” Dr. Williams stated.

“Unfortunately, we haven’t been able to make heads nor tails of any of them,” Dr. Kallas added.

“Perhaps we can help,” Keris replied. “Which one would you like to know about?”

“Well, all of them. Perhaps start with that one on the table right there,” Dr. Kallas replied, pointing across the room to the left side of a table along the far wall.

Keris picked the gadget up. “This is a standard positron pulse weapon equipped with long-range sight and a standard...”

“Well, standard for its time,” Nesis interjected.

“...power pack,” Keris continued. “Here, let me demonstrate.”

Keris moved to the right-hand side of the room and Nesis moved to the left. They turned around to face each other. Keris fired the weapon. It emitted a series of blue lightning balls that travelled across the room, hitting Nesis square in the chest. We all flinched.

Dr. Madson covered her eyes. A moment later she looked up. “Oh my god! What the hell are you doing? You’re going to kill him!”

“Impossible,” Keris replied. “These weapons are ancient. None of them can penetrate our personal shields or do harm to us. Here, would you like to try?” Keris held the device in front of him.

“Not bloody likely!” Dr. Madson exclaimed.

“Your loss,” Nesis stated. “Firing a historical weapon is part of the whole museum experience.”

“Wait, so people would come here and fire those things at each other?” Dr. Kallas asked.

“Oh yeah,” Keris replied. “Our young used to especially enjoy it.”

“Your young? You mean children were playing with that weapon?” Dr. Madson replied in horror.

“Yes, this one, that one, all of these,” Nesis replied. “It’s perfectly safe. These weapons auto-target. There’s no way for you to accidentally hit the wrong thing.”

“Auto-target?” Dr. Williams asked.

“Warfare changed a lot after the development of auto-targeting,” Nesis replied. “We no longer needed to aim skillfully. Just point in the general direction and the weapon will do its

job. Since then, warfare has been more about having better armor, tech, firepower, and strategy.”

“So those films we see depicting alien invasions are even more inaccurate than we imagined,” Dr. Kallas stated.

“So, wait. All the gadgets in this room are weapons?” Dr. Williams asked.

“Yes, this is the armory,” Keris replied. “Or, well, the museum version of it. The actual armory is quite a distance from here. Would you like to see it?”

“No, no, no, no, no!” Dr. Williams replied.

“Would you like us to demonstrate any of these other weapons?” Keris asked. “I especially recommend this one.” He picked up a much larger device. “It was our first handheld antimatter weapon. A true piece of history.”

“Umm. No, I think we’ve learned enough for this visit,” Dr. Williams replied.

“Before we go, you must see the ion cannon,” Nesis exclaimed excitedly. “The highlight of the tour back then. I mean, it’s old and crappy. But you get to fire it!”

The two Enu scientists hurried out of the armory. We followed once again.

“I wouldn’t mind firing the ion cannon,” Dr. Williams stated.

“No. You wouldn’t,” Dr. Madson replied. “Remember when we were kids and you fired Uncle Jack’s shotgun? And blew a hole in the door. In the winter. And almost hit Dad?”

“But... We’re in the middle of an intergalactic void... What could I possibly hit?” Dr. Williams replied.

“What about when that shot finally hits some poor planet and wipes them out?” Dr. Madson replied.

“That would take millennia,” Dr. Williams stated. “And besides, the chances of hitting an inhabited planet are astronomically low.”

“I don’t care what you think those chances are,” Dr. Madson replied.

As fun as it was to observe Dr. Madson teasing Dr. Williams, I still had actual questions for the Enu. And so, I interrupted their exchange, much to the dismay of Drs. Kallas and Nara, who were clearly enjoying it.

“Rosral told us that you aren’t part of their alliance. Why is that?” I asked.

“We’re part of a different alliance,” Keris replied. “There are many alliances and cooperatives scattered throughout the universe. It’s a big place. Too big for a single alliance.”

“Do you cooperate with our alliance?” Dr. Kallas asked.

“On occasion,” Keris replied. “When we need to.”

“Umm. Do alliances ever go to war with each other?” Dr. Williams asked.

“Not that I’ve ever heard of,” Keris replied. “Each alliance controls and defends its own region. The region of space that we occupy is far from the region controlled by your alliance. But there is sometimes overlap between controlled areas.”

After a very long walk, we finally reached a massive circular room at the edge of the ship. The entire ceiling looked like it was open to space. We surmised, thinking about QUERY scans we’d seen of the Asir, that it must have been one of those hemispherical observation decks we’d speculated about. The room was full of control consoles. The Enu led us to a large chair at the center of the room.

“Would any of you like to fire the ion cannon?” Keris asked.

“Ye...” Dr. Williams started. Dr. Madson punched his arm.

“No,” she replied.

“We’ll demonstrate it for you,” Nesis said. “For nostalgia’s sake.” He sat in the large chair and activated a control console on one of its arms. A holographic display appeared before him. The display reacted to his movements. Outside, we saw an absolutely massive gun turret swivel around in response to his controls. He fired the weapon. A huge green beam, easily

hundreds of meters in diameter emanated from the turret. Accompanied by a very loud, very deep reverberation. The room shook slightly. And then it stopped. We watched as the beam travelled into the distance at a frightening speed. A moment later it was gone, too far away to see. To be honest, the sight of the turret firing was spectacular. I could see that the others were in awe of what we'd just witnessed. We stood there in silence for a moment.

“What are the effects of something being hit by this weapon?” Dr. Kallas asked.

“If fired at a moon or planet, it would be the equivalent of a very large asteroid impact,” Keris replied. “A planetary extinction level event. Assuming they had no shields.”

“But who doesn't have planetary shielding nowadays?” Nesis laughed.

“Umm. Us?” Dr. Madson replied.

“Oh. Yeah. Right,” Nesis replied. “Don't worry. We won't fire it at you!”

“Well, that's comforting,” Dr. Williams replied sarcastically.

“But who's to say there aren't other races out there with equivalent weapons?” Dr. Kallas stated.

“These are very old weapons,” Keris replied. “Nobody's used tech like this for millennia.”

Dr. Kallas's point had, obviously, escaped the Enu. He didn't push it further.

“Do you have any more questions for us?” Keris asked.

We were all quite tired from talking. And quite overwhelmed by the experience. And although we probably did have more questions, we had lost the capacity to come up with them. And so we concluded the tour and thanked the Enu wholeheartedly for their time and assistance. Keris materialized the visitors badges to our location and I picked the box up ready for translocation. Neris also provided us with a device to contact them with, should we come up with more questions later. It was also large, metallic, and very heavy. And then they beamed us back to Beta.

Upon arrival, the box I had been carrying suddenly became a great deal heavier, due to the change in gravity. I immediately dropped it, somehow managed to avoid my toes by mere millimeters. Rosral appeared a moment later, asked us how the visit had been, and then helped us out by beaming the heavy box over to our research area in Seris 14. She seemed to be back to normal. Not distracted like she'd been earlier in the day. A day that had ended up being one of the most educational and surreal I could recall in a long time. Time for us to return to our digs, relax, and reflect upon our experiences over a glass or five of Sec. Rosral joined us. We didn't need to ask her twice.

And it was on that evening, while we were sat in our garden discussing our visit to the Enu museum that we learned about yet another escalation of tensions on Earth. Although we'd only been on Beta for a few weeks, we'd quickly left the affairs and troubles of Earth behind. And though we'd occasionally checked news and social networks from our old planet when

we first arrived, the urge to do so had melted away rather quickly. And so, it was Rosral that brought the situation to our attention.

“Have you seen the news from your planet?” she asked.

“No,” Dr. Williams replied. “And I’m not interested.”

“You might want to see this,” Rosral stated. She activated the holographic interface on her green card and started playing a news cast.

“This just in, on our breaking news story,” the reporter stated. “We are getting reports of a major escalation in ongoing US-China standoff in the South China Sea. Earlier this year, the US sent an aircraft carrier fleet into the South China Sea and tensions between the two countries have been escalating ever since.”

“Now, those tensions have increased to a critical point as it has been confirmed that two of the US vessels in that region are taking on water,” the reporter continued. “According to reports, there have been no casualties and the crew of the two vessels is currently being evacuated. However, the extent of the damage is still unknown. China earlier released an official statement stating that it did not fire upon the US fleet. We will continue to monitor the situation and keep you updated as more information becomes available.”

“Well, that was bound to happen,” Dr. Williams stated, sarcastically.

“There have been tensions over those islands for decades. I wonder what changed the situation?” Dr. Madson remarked.

“What changed?” Dr. Williams replied. “The administration. They’re idiotic QAnon crazies and lunatics!”

“Irrationalists,” Dr. Kallas replied. “The all-encompassing term for idiocy, lunacy, and general derangement.”

“This news doesn’t surprise me,” Dr. Nara stated.

“Ahh, but it might,” Rosral replied, taking a sip from her Sec glass. “Look at this.” She interacted with the holographic interface and brought up a quantum spacetime inference scan from the region. We were watching the situation live.

“A real-time terrestrial QUERY reading,” Dr. Kallas remarked. “That’s forbidden.”

“Forbidden on Earth. With our QUERY devices,” Dr. Williams replied. “Not here!”

“Oh wow!” Dr. Nara replied. “I hadn’t even thought of that!”

“Wait, these cards function as QUERY devices?” Dr. Williams asked.

“Yes,” Rosral replied. “Of course.”

“Makes sense,” Dr. Kallas replied. “It must be needed to figure out where to translocate us to. Also, remember that time we scanned in those objects...”

“Shhh!” Dr. Madson whispered.

“I knew about that,” Rosral stated, smiling. “Very innovative of you.”

“So, you mean I could have been researching HEX from the comfort of my couch?” Dr. Williams asked.

“Yes,” Rosral replied.

“Wait, why are you showing us this?” Dr. Madson asked.

“We’ve been monitoring the situation. If China did fire on the US vessels, we’d expect to see damage consistent with torpedo impacts or similar,” Rosral stated. “But we don’t. Look at this.”

Rosral panned the view to the underside of one of the damaged ships. She zoomed in and slowly followed the ship’s underside. Multiple identically sized and perfectly circular holes peppered the underside of the hull.

“You’re right. Those holes don’t look like they were caused by projectiles or explosions,” Dr. Kallas stated.

“Do we think the Chinese have developed a new weapon?” Dr. Madson asked.

“They must have,” Dr. Williams replied.

“Your news channels won’t tell you about this,” Rosral stated. “That’s why I wanted you to see it for yourselves.”

“What do you think happened?” Dr. Nara asked.

“I’d rather not speculate,” Rosral replied.

“How about some sort of long-range powerful laser?” Dr. Kallas hypothesized.

“The water would invariably attenuate the signal,” Dr. Williams replied.

“Yes, you’re right,” Dr. Kallas replied. “Must have been something close up. Perhaps submersible drones equipped with cutters, or oxyacetylene torches? They could easily be remote controlled.”

“Or AI controlled,” Dr. Williams replied. “You know, like those Spectre drones we saw being used in the US.”

“Yeah! They just swim in, cut the hull and then swim away,” Dr. Kallas replied. “If you look closely enough at those holes, you can see evidence of cutting or perhaps melting.”

“You know, you might be onto something there,” Dr. Williams replied.

Dr. Nara pulled out her blue card and tuned into a social network. “[Here’s what the idiots are saying,” she noted. She showed us some posts.

US vessels attacked by China in the South China Sea? This is why we need strong borders!

#AmericaFirst #BorderSecurity #DefendOurNation

Another example of why we must protect US interests in the South China Sea!

#AmericaStrong #SouthChinaSea #DefendOur Sovereignty

China's aggressive behavior in the South China Sea must not be tolerated! #StandUpToChina

#PeaceThroughStrength #NoMoreIntimidation

US vessels under attack & now taking on water? Unacceptable! #AmericaFirst #RiseUp

#DefendOurNavy #RetaliateNow

We must take action to protect our sovereignty & our Navy! #AmericaStrong

#ProtectOurVessels #RetaliateNow

“Oh great,” Dr. Williams stated. “Most politicians follow these online opinions to the letter. I suppose we can expect retaliation.”

“Thank god we’re not there anymore,” Dr. Nara replied.

Chapter 39 Aliengate

Just a day or two after our visit with the Enu, we were summoned back to Earth by Professor McTavish in what he told us was a dire emergency. None of us had expected to have to return to Earth in the foreseeable future, and so the request was met with much scorn. Apparently, McTavish didn't like to travel by translocation. And so it was up to us to return to London and visit him. Luckily, Rosral arranged the trip directly via translocation, so we didn't have to fly or anything like that. Drs. Kallas and I went, sparing everyone else the bother. Dr. Williams was hugely appreciative of the gesture and informed me that I owed him one. I made a mental note of that fact, and started considering a variety of obvious near-future scenarios where I might cash the favor in.

"I trust y'r doin' alright?" the professor asked us as we arrived in his office. "Nae need tae answer that," he added.

"We may have a wee bit of a problem," he continued. "I'd like youse both tae read this article."

Professor McTavish furnished us both with a tablet containing a long and well-research investigative journalist piece that had been recently published in one of the more popular online tech outlets.

The article, which was written by investigative journalist Jen Starral, was entitled "Are we being assisted by scientists from the future?". In the piece Jen outlined how a series of anonymously published preprints uploaded to a scientific archive over the past year had

solved multiple proofs, many of which were considered decades from being solved, and provided insights into biochemistry that were "just too lucky to be real".

Her article went on to explain, in detail, why each paper was so ground-breaking, and why it was unlikely that the solution presented by each publication could have been made with our current understanding, computer systems, biochemistry advances, and so forth. She was, of course, describing the papers from the Eilanas academy that we had been leaking.

Her report went on to explain how none of the anonymous preprints had ever been subsequently re-uploaded to the archive with details of the researchers' names or academic institutions. She also noted that the writing style in many of the papers was distinctively similar.

"This is a very good piece of investigative journalism," I noted. Professor McTavish didn't look very happy with my comment.

"I'd like youse to explain te me how y'r process f'r leaking these papers w'rks," he stated.

"We follow a few basic principles," I replied. "We never leak publications on the same topic too close to each other. We prioritize niche topics over popular ones. We never leak anything too obviously ahead of its time."

"We've considered the idea that some of the proofs solved in the papers we've leaked might make for interesting stories in technical and scientific circles," Dr. Kallas added. "In cases where that did happen, and they've been very rare, the authors of those stories noted that the

papers were leaked anonymously and that they'd follow up with more information once the team behind the research was revealed. Of course, the authors never bothered. As we predicted”

“Individually, each paper we leak contributes to small advances in their respective fields, and sometimes in adjacent fields,” I added. “Only when viewing all leaks together might one consider the situation suspicious.”

“And there ya go!” McTavish replied angrily. “That’s what the wee lass has gone and done.”

“We actually gamed the idea that this would happen as part of a risk analysis,” I replied.

“Yes,” Dr. Kallas added. “Since the leaks can't be traced to us, or anyone working with us, they simply make for an interesting and mysterious story. Our risk analysis concluded that such a story would be simply too complex for the layman to understand and would therefore not be seen as newsworthy enough to make it past certain niche communities.”

“Too complicated tae mek it into the news es what yer sayin’?” the professor asked.

“Yes,” I replied. “The story will be gone by the next news cycle.”

“Twenty-four hours max,” Dr. Kallas added.

“Aight, be gone wi’ y’s and be more careful next time,” the professor stated. And so, we left. Just a quick in and out, as per usual. The others were surprised when we returned less than

five minutes later. Especially Dr. Williams, who then labored on about how his bollocking sessions had sometimes lasted upwards of an hour.

What we'd predicted was exactly what ended up happening. Jen's long and thoroughly researched article was too complex and too-long-didn't-read for the public. The story evaporated in less than a day. We all collectively breathed a sigh of relief, deduced we'd dodged a bullet, and went back to our work. We felt bad for Jen, though. Her work had been impeccably researched. And it no doubt took her months.

The second set of leaks, which were published on the Tuesday of the week following Jen's article, were clippings of old chat transcripts we'd had with the Eilanas shortly after we'd set up our communications channel with them. The one that used the original QUERY-visual communications mechanism.

The leaked chat logs, luckily, weren't all that incriminating. Most of the communications revolved around us asking for clarification of various concepts provided by them through the academy. However, to the trained eye, it was possible to connect those chat logs with the papers referenced in Jen's article.

No names were mentioned in the chat logs, and thus we were still off the hook in terms of attribution. As much as the logs corroborated Jen's article, the story was still a little too niche to attract any serious attention from the mainstream media. However, it did attract the attention of a few investigative journalists, who noted the connection with Jen's story and the fact that it gave credence to her article. We'd expected to be summoned by McTavish when those stories hit, but, surprisingly, we weren't.

The third leaks were published on the Thursday of that same week. They contained a series of still images that we immediately recognized must have been captured by researchers working on HEX. Or what we now knew as Asir.

The leaked images clearly depicted gadgets and consoles found on the ship, pictures of the interior, showing the size of furniture and doors compared to humans, and even views from out of a window, in which the exterior of the ship could be seen.

“We must have been hacked,” Dr. Williams stated.

“Both sets of leaks – those from Tuesday and those from today are from content stored in our private repository,” Dr. Kallas added.

“Either that, or we have an insider who is leaking this stuff to the press,” Dr. Williams added.

“Odd that no video footage of Asir was leaked,” Dr. Kallas noted. “All that stuff is in the same place as the images.”

“Perhaps those will be leaked next,” Dr. Williams posited.

“I suppose we have no idea as to the source of those leaks?” Dr. Madson asked.

“It seems not,” I replied. “But the media are paying attention to these. There’s already been a story on the news about it.”

“Ahh, crap,” Dr. Williams replied. “I suppose McTavish will be summoning us again.”

“He already has,” I replied. “We’re due back there in about an hour.”

“Good luck with all that, then,” Dr. Williams replied.

“I was thinking of bringing you along, Robert,” I replied.

“What?!?! No! Please!” he pleaded.

“Just a joke,” I replied. “Riks and I will handle it again. That’s a second one you owe me.”

An hour later we were back in London.

“So, what d’ye kno’ about these new leaks?” McTavish asked.

“We still don’t know the source,” I replied.

“We think we’ve either been hacked or it’s an insider,” Dr. Kallas added. “More likely the latter.”

“Hacked?!?” McTavish replied angrily. “I thought y’r alien buddies w’r doin’ security f’r y’r systems nowadays?”

“They are,” I replied. “In my opinion, the chat leaks could have been a hack. But not the leaks from the Asir research. That’s all been done since we moved to the Eilanas systems.”

“So y’r sayin’ it’s more likely an insider job?” the professor asked.

“That’s our working assumption,” I replied.

“And how dae we find oot who ded the leakin’?” McTavish asked.

“There are a lot of people involved in this work now,” Dr. Kallas replied. “Over one hundred on Beta alone. And more than twenty involved in Asir research. Finding that out might be difficult.”

“I can assure you that it wasn’t one of our team,” I added.

“It’d better not be!” McTavish bellowed. “Anyways, I’ll get on te the commission aboot th’s. Now get oot’e h’re the lot of y’s.”

That Friday, newspapers and tabloids were running the story on their front pages. And the leaked pictures were displayed on every TV news bulletin. We kept our eye on things from Beta and watched in horror as the story gained momentum over that weekend.

On the following Monday, the final and most explosive leak was published. It was a video depicting myself and Dr. Williams using the Eilanas console. The footage, that lasted about twenty seconds and included audio, clearly depicted a large and very clear holographic

representation of Rosral conversing with us. Rosral's alien language could be clearly heard in the recording.

Whoever had captured footage must have done so from a distance, and from behind us. Luckily, it wasn't possible to see our faces at any point. The video had obviously been captured sometime in the past, since it depicted the old lab that we worked in prior to our move to Sweden and then Beta.

On the back of the previous leaks, this footage gathered the full attention of the press. Within hours, programs were being interrupted with breaking news on the story.

"Oh crap!" said Dr. Williams as we started watching the leak for the first time. "I guess I'm not avoiding McTavish this time."

"I guess not," I replied. "This'll be my third visit in less than a week. I imagine his patience must be wearing thin," I added.

"When will these leaks end?" Dr. Nara complained. "Enough already!"

"And who's doing this?" Dr. Madson added.

"Who would want to do this?" Dr. Kallas added.

"The fucking far right," Dr. Nara replied. "This feeds straight into their narrative. I bet we have some far-right plant in one of our research teams."

“Jesus, a far-righter might be on Beta?” Dr. Madson replied.

“They’d better find out who it is, quickly,” Dr. Nara stated.

“And beam them into space,” Dr. Williams jested.

“We’re clearly in trouble,” I stated. “It’s only a matter of time before someone recognizes our old lab from that footage. And then they’ll put two and two together and come up with our names.”

“Do we think the hack may have been done via QUERY?” Dr. Kallas asked.

“We have to assume that some of those oligarchs probably already got their hands on a QUERY device. What if they’ve looked at the facility in Sweden and know about our translocation hub?”

“Yeah, but QUERY to Beta is jammed. And Earth-based QUERY is still on EPOCH4. There’s no way they’ll know where we are. And there’s no way they’ll have used their device to hack data off a computer. The resolution is just too coarse,” Dr. Williams replied.

“I suppose there is one possibility,” Dr. Kallas stated. “We all have blue cards. That includes any potential insider. They could have used the card on Earth to materialize an Eilanas device.”

“I could see that happening. Someone paid off by a nation state or oligarch,” Dr. Madson added. “People can always be bought with enough money.”

“I wonder if Rosral has any theories?” I asked.

“We haven’t seen her since this whole fiasco began,” Dr. Madson stated.

“Let’s be done here for the day and grab a drink,” Dr. Nara suggested.

“Good idea!” Dr. Kallas replied. “I’m parched!”

We retired upstairs to our usual spot in the garden and called Rosral on thr blue card. She was happy to join us.

“Long timeeee nooooo seeeee!” Dr. Nara shouted as Rosral appeared. This time, Rosral got a hug. It looked like she was getting used to being hugged by Dr. Nara. She didn’t even show teeth this time.

“Hear about these leaks?” Dr. Madson asked, pouring Rosral a glass of Sec.

“Yep,” Rosral replied. “Your press really do love to blow things out of proportion.”

“Blow things out of proportion?” Dr. Williams replied. “If verified, these leaks blow the lid off a highly secretive collaboration with an alien species!”

“Ahh, but discrediting the whole thing is trivial,” Rosral replied. “The chats can be written off as fiction. Someone writing a story. And the images from Asir can be written off as computer generated. Part of some new video game.”

“And what about the video of us talking to you?” Dr. Williams asked.

“You were testing out new tech. A holographic video call system,” Rosral replied.

“Umm. One minor point you might have missed,” Dr. Williams replied. “It clearly shows a video call with an alien.”

“It doesn’t,” Rosral replied. “It shows an innovative algorithm that converts the face of the caller into that of an alien. For fun. You know. Like those video chat things you already use that convert faces into cats, or whatnot.”

“And the voice?” I asked.

“Same thing,” Rosral replied. “Innovative tech to enhance realism. AI and all that stuff.”

“I think you’re onto something there,” Dr. Madson replied.

“You should work in public relations,” Dr. Nara added. “I would have never thought of those explanations!”

“And yet you’re the ones from the planet that’s so bathed in scandals and news stories,”

Rosral replied. “I would have thought such spin would be second nature to your species.

Anyway, how ARE you handling it?”

“Currently, we’re saying nothing,” I replied.

“To be more accurate, nobody’s asked us about it yet,” Dr. Kallas added. “But if they do, we’re to say nothing.”

“They will ask,” Rosral replied. “At least for that last leak. And then they’ll pin them all on you. If you don’t comment.”

“You have a point,” I replied. “I’ll contact McTavish with your ideas.”

“What, he hasn’t summoned you yet?” Dr. Kallas asked.

“Well, actually, he has,” I replied. “But it’s past the end of the workday over in London. So I haven’t answered.”

“Won’t that just piss him off more?” Dr. Madson asked.

“Nah, I’m sure he’s already at home, having a wee dram,” I replied. “We’ll probably have to go there tomorrow, though.”

“Looking forward to that?” Dr. Kallas asked.

“What do you think?” I replied.

And summoned to McTavish’s we were. He was every bit as mad about the situation as we’d expected. But he liked Rosral’s advice on how to deal with inevitable questions. And that cooled him off a bit. While we were in London, we decided to go on a bit of a walkabout. We hadn’t been on Earth for a few weeks and felt the need to take in the local milieu. Well, that and buy some decent sausage rolls. Even after a short break from Earth, we felt like tourists. As we were walking about, we noticed that the scandal now had a name. It was plastered all over the front pages of newspapers: Aliengate. And it wasn’t just the tabloids that were using it.

“Looks like the stories about these leaks aren’t going away,” I said upon our return to Beta.

“We saw the phrase Aliengate plastered all over the papers in London.”

“You obviously haven’t seen the television channels,” Dr. Madson replied. “They’ve gone full Aliengate. Like, all of them. Twenty-four seven coverage.”

“Oh shit, really?” I replied.

“Yeah, check this out!” Dr. Kallas remarked, holding his blue card up. The holographic display depicted a three-by-three grid of news channels all covering the scandal.

“Right,” I replied. “What are they saying?”

“There are many topics being covered by talking heads, interviews, opinion pieces, and what they’re deeming specials. How long have our governments been cooperating with aliens? Why have they been covering it all up? How have they been covering it up? What sort of advanced technologies do they now have at their disposal?” Dr. Madson replied.

“They’re also running specials on area fifty one and those other alien coverup conspiracy theories,” Dr. Kallas added.

“The idea that we’re collaborating with advanced aliens must now be a reasonable assumption in the public’s mind,” Dr. Madson replied. “That assumption has been bolstered by teams like ours sharing observations of newly discovered technologically capable alien life for years. Many of those made it into the news.”

“Yep, that’s only going to make this current scandal more believable,” I replied.

“What are government saying?” I asked.

“Looks like they’re either refraining to comment or flat out denying it,” Dr. Nara replied.

“Right,” I replied. “So, they’re not bothering to take our advice. Great.”

“The internet is going mad about this whole thing,” Dr. Nara stated. “Aliengate and related topics have been trending through the roof since this thing broke.”

“What are they saying?” I asked.

“That governments are in league with advanced extra-terrestrials,” Dr. Nara replied. “Also, there are groups organizing protests everywhere. And they’re growing in numbers.”

“Irrationalists?” Dr. Kallas asked.

“Yep, irrationalists,” Dr. Nara replied. “Apparently there are large demonstrations scheduled for tomorrow. In major cities and capitals across the US and Europe. Here, check some of these posts.”

Our governments have betrayed us! Why do they keep alien-tech a secret while they strip away our rights? It's time to take to the streets! #Resist #Demonstrate

Who are they really working for? They’re not fit for purpose! We demand the truth!
#SecretsAndLies #JoinTheFight

How can we trust our governments when they have been working with extraterrestrials?
#Traitors #UnelectedPower

Our governments are supposed to be for the people, but instead they are enabling aliens. It's time to show them who is really in charge! #RiseUp #TakeAction

The truth is out there! Join us in our fight against traitorous government corruption and covert alien dealings. #FightForTruth #MarchForJustice

We monitored the situation from Beta over the next few days. Aliengate went nowhere, and the demonstrations, which attracted tens of thousands in dozens of major cities and capitals, only served to give the news even more air.

A week later, a fresh round of demonstrations took place. And many of those became violent. Aliengate had become the perfect breeding ground for the irrationalists, and we feared what might happen as the movement continued to swell in numbers.

Chapter 40 Stylish outdoor wear

Two weeks after Aliengate broke, we were visited by Rosral. We were in our lab working on research when she arrived.

“Oh, hi Rosral!” Dr. Madson exclaimed. “It’s been a while!”

“Are you here about fixing the situation on Earth?” Dr. Williams asked.

“No,” Rosral replied. “That’s not our problem.”

“Not your problem?” Dr. Williams stated angrily. Dr. Madson slapped him upside the head.

“Sorry, Rosral! Are you here for a chat, or did you have something more specific in mind?”

Dr. Madson asked.

“I’d like you to join me for a trip outside the dome,” Rosral stated.

“Outside the Vedess dome?” Dr. Williams asked.

“Yes!” Rosral replied. “I’d like to show you something of interest.”

“Isn’t it dangerous for us out there?” Dr. Kallas asked. “Solar radiation and all that stuff?”

“Yes, it is,” Rosral replied. “But I can provide you with protection from it.”

“Protection?” Dr. Williams replied. And just as he was speaking, Rosral materialized suits onto us. They were identical in design to hers, only fitted tightly to our own forms. It was a strange experience. Looking around at my colleagues, I could see how the suits were perfectly tight-fitting. I hadn’t worn anything tight-fitting in my life. I was expecting more than a mild discomfort, but somehow, I couldn’t even feel the suit on me at all. It almost felt like being naked.

“Robert, how stylish!” Dr. Madson commented.

“Wait! What?!?” Dr. Williams replied.

“Ooh, yeah! Suits you, sir!” Dr. Nara added.

“Very sleek,” Dr. Kallas commented.

“Ah, come on!” Dr. Williams exclaimed.

“Let’s go,” Rosral said. And before we could even blink, we were translocated to the edge of Vedess, just inside the dome.

“This suit is way more comfortable than I’d imagined,” Dr. Kallas noted.

“It’s almost like it has its own internal air conditioning,” Dr. Madson stated.

“No wonder Rosral didn’t get sweaty on Esid,” Dr. Williams stated.

Rosral smiled.

“You’re all correct,” Rosral stated. “These suits are fully temperature controlled. They will also shield you from any harmful radiation emitted by our host star and irritants we might encounter while moving through the undergrowth.”

“Can I keep this suit?” Dr. Nara asked. “It’s way more comfortable than my own clothes.”

“I concur,” Dr. Kallas stated.

“There’s no obvious way of removing this garment. It has no zips, buttons, or anything that can be undone. What do I do if I need to use the toilet?” Dr. Williams asked.

Rosral didn’t answer.

“We’re going for a hike, I take it?” Dr. Madson asked.

“Yes,” Rosral replied.

“You’ve picked a beautiful day for it,” Dr. Madson stated.

It was slightly overcast, not raining, and wind speeds were at a very gentle breeze. As we passed through the dome’s membrane, the only part of my body that felt the change was my face. The suits they’d provided us really did negate the elements.

Once outside of the dome, Rosral instructed us to follow her. We started off by hiking a trail around the circumference of the dome. The path mostly consisted of the same moss-like grass we’d encountered in many gardens in Voriss, and it presented us with a very easy walking experience. To the left of us we could see numerous Seris structures and gardens that were commonplace inside the dome. To the right of us was dense undergrowth beneath a forest of tall trees resembling our evergreens, only red in color.

After about ten minutes, we encountered a path that cut into the forest. Rosral took a right-hand turn, and we followed her into the woods. The path steepened, and we followed the uphill slope through the trees for another fifteen minutes or so.

Although we’d done a lot of walking on Beta, it had all been at a flat incline. The uphill nature of our trek started to leave many of us a little puffed out. The incline eventually levelled off, and after a short while we found ourselves walking downhill.

The forest was quiet – all I could hear were our footsteps and the sound of wind blowing through the trees. Ten minutes later, we arrived at a small stream situated in a clearing in the woods. Rosral stopped and we all took the opportunity to catch our breath. Walking the uphill trail at the pace we'd kept would have normally left me sweaty. However, the suit adjusted accordingly and kept me cool, even after we'd stopped walking.

“Much of the local wildlife tends to steer clear of the dome,” she stated. “That is why this trek has been so quiet.”

“Dr. Stall encountered some angry birds on his first morning in Vedess,” Dr. Madson stated.

“I've seen them too,” Dr. Kallas added. “Very aggressive.”

“Have you guys seen those squirrel-looking creatures in and around Mikato market?” Dr. Williams asked.

“They look more like lemurs to me,” Dr. Kallas replied.

“Squirrels, lemurs, whatever,” Dr. Williams stated. “They seem to be wildlife. Not pets.”

“I did say much of the wildlife,” Rosral replied. “There are some local creatures that don't seem to be scared by the dome.”

“On Earth it would be seagulls. And rats,” Dr. Williams stated.

“Are we going to observe local wildlife?” Dr. Madson asked.

“Something like that,” Rosral replied.

“This is a long trek,” Dr. Williams remarked, still out of breath. “Couldn’t we just have translocated?”

“Translocation is not permitted outside of any domes on Beta,” Rosral stated. “Except for specific research reasons or in cases of acute emergency. We must hike there. And back.”

“How much longer is it until we get ‘there’?” Dr. Williams asked.

“No longer than another Earth hour or so,” Rosral replied.

“An HOUR?!?” Dr Williams replied. “Seriously? An HOUR?!?”

“Stop whining Robert. It’ll do you good,” Dr. Madson said.

After our short rest, we waded through the shallow stream and further into the forest. The trek took us up and down a few more small hills until we reached the end of the trodden path we were on. The rest of the hike would require us to wade through foliage. Rosral stopped for a moment to inform us that some of the plants we were about to walk through were similar to Earth’s stinging nettles and that if it wasn’t for our suits, we’d be experience a great deal of discomfort. She told us to keep our hands up to avoid getting stung. In addition to the nettles

were prickly brambles, some with thorns as long as those on gooseberry plants. Amazingly, none of the thorns penetrated our suits.

Rosral's estimate of an hour turned out to be more or less correct, and we finally arrived at another clearing in the woods. At the center of the clearing was a large rock. Lots of small stone fragments were scattered on the ground around it. Rosral picked one of the fragments up and showed it to us.

"Anyone here have any idea what this is?" Rosral asked.

"A stone tool," Dr. Madson replied. "Similar to those our ancestors made during the stone age."

"Well done," Rosral stated. "You're looking at discarded stone tools. Created by one of the species indigenous to this planet."

"This planet was already inhabited when you moved here?" Dr. Madson asked.

"Yes," Rosral replied.

"I always thought you'd terraformed it," Dr. Kallas stated.

"We terraform many of the planets we colonize. But this one was inhabitable before we arrived," Rosral replied.

“How did you end up choosing this planet?” Dr. Madson asked.

“We chose it for its location in the galaxy, because it had conditions similar to our original home world, and because it didn’t already contain any technologically capable species,”

Rosral replied. “We surveyed the planet thoroughly before moving, and no species here had even reached the stone age. However, we’ve been here long enough that an indigenous species is now on the cusp of becoming technologically capable.”

“What does this mean for you?” Dr. Madson asked.

“Although it will take this species a while to become aware of us, our time here is limited,”

Rosral replied. “We’ll need to vacate this planet in the next thousand years or so to prevent any contamination to this species’ development.”

“Did you vacate your original home world for the same reason?” Dr. Kallas asked.

“Yes,” Rosral replied.

“Where will you go?” Dr. Nara asked.

“We haven’t chosen a suitable planet yet,” Rosral replied. “Options are already being explored, though.”

“Will you miss this place?” Dr. Nara asked.

“Of course,” Rosral replied. “But we will build a new home. And it’ll be a new beginning. We’ll enjoy the challenge.”

“Wow,” Dr. Nara stated. “I never expected this trip to be so poignant. I almost feel like crying.”

“Yeah,” Dr. Kallas added. “I was expecting to watch birds and observe wildlife.”

We headed back to Vedess. The return trip felt shorter. But it always does, doesn’t it. On our way back I wondered if we’d ever get to the point where we’d face the same dilemma. Moving off our planet to make way for a new intelligent species. But with what was happening on Earth, it seemed doubtful, to say the least.

Apparently, during our return trip, Dr. Williams had grown accustomed to the exercise and hadn’t complained nearly as much. At least until we arrived back inside the dome.

“Right, I’m going straight home. I’m famished,” Dr. Williams stated.

“Wait!” Dr. Kallas exclaimed. “What about these suits? I have no idea how to take mine off, and I need the toilet. Badly.”

Rosral rematerialized our old clothes onto us. Everything felt a little less comfortable.

“So, how do you pee in those suits?” Dr. Kallas asked.

Rosral was already gone before he'd finished his question. And so, the mystery remained with us. Questions about how one changes in and out of or uses the toilet in their space suits would have to wait for another day.

Tired as we were, we still convened that evening for our usual chat.

"Holy shit, things are really kicking off back on Earth!" Dr Nara remarked.

"Aliengate isn't going away, is it?" Dr. Kallas remarked.

"No," Dr. Nara replied. "If anything, it's morphed into something much bigger. Every time a politician denies the allegations, it grows. And it's starting to tip the polls in favor of populists and fascists."

"I always imagined first contact with aliens would be a moment of enlightenment and joy for our species," Dr. Kallas said.

"Me too," Dr. Nara replied. "I bet that's been the case on other planets."

"I heard that they're now using QUERY for surveillance," Dr. Williams noted. "And anti-terrorism."

"I still don't understand why we can't just ask one of our allies to translocate the main irrationalist instigators into near-Earth orbit," Dr. Kallas remarked.

“You know what their answer would be,” Dr. Nara replied.

“We can’t get involved,” Dr. Williams replied in a funny voice. “Deal with your own problems. It would only inflame the situation further.”

“I can’t see how that wouldn’t be a reasonable solution,” Dr. Kallas replied. “If only we could learn how to work those systems ourselves. I bet that functionality is present on the blue card.”

“For sure,” Dr. Nara replied.

“It says here that the UK is considering blocking social networks from their country’s internet,” Dr. Madson added. “To stem terrorist recruitment and online coordination.”

“That probably won’t help,” Dr. Williams replied.

“Have you seen the footage from yesterday’s demonstrations?” Dr. Kallas asked.

“Don’t you mean riots?” Dr. Williams replied.

“Apparently they’ve blockaded streets with trucks and lorries in Los Angeles, Dallas, and Atlanta,” Dr. Nara stated. “Police can’t even get in to control the situation anymore.”

“Didn’t they already declare a state of emergency in some of those places?” Dr. Kallas asked.

“I think so, yeah,” Dr. Madson replied. “They’re bringing the army in to help put out fires, break the blockades, and diffuse the riots.”

“Wow, there are even riots in Australia,” Dr. Kallas stated, browsing his blue card.

“Luckily, that situation in the South China Sea didn’t escalate,” Dr. Madson added.

“Yeah, but it’s only adding fuel to the fire for these irrationalist types,” Dr. Nara replied.

“They’re calling for an uprising against the administration.”

“I always thought the US administration was full of people sympathetic to the irrationalist cause,” Dr. Kallas replied.

“Many are,” Dr. Nara replied. “But not enough, apparently. Or they’re not extreme enough. Who knows with these people. They certainly don’t seem to be too fond of the current president.”

“I wonder if we’ll see a repeat of January sixth?” Dr. Madson remarked.

“It did happen a long time ago,” Dr. Williams replied. “Maybe the government don’t think it can occur again. Especially after all the stuff that’s happened since.”

“I’ve read that these demonstrators are using pipe bombs and Molotov cocktails,” Dr. Kallas replied.

“Yeah, didn’t they set fire to some government building in the US?” Dr. Madson asked.

“They did, yes.” Dr. Nara replied. “Nobody was hurt.”

“That surprises me, though,” Dr. Williams stated. “Don’t they have those Spectre drones out in force around the riots?”

“They do,” Dr. Nara replied. “I’ve seen them on the footage. I guess there are just too many rioters for the drones to deal with.”

“Oh wow, check this out!” Dr. Madson exclaimed. She held her blue card up. It was displaying a breaking news report live from outside the Houses of Parliament in London.

“Good evening, this is a breaking news report.

A shocking tragedy has just unfolded in the heart of London. Earlier this afternoon, a missile was fired at the Houses of Parliament, breaching a window before exploding. Tragically, two members of parliament and three civil servants have already been confirmed dead, while eye witnesses report seeing a man launch the rocket using a portable device from the south bank of the Thames.

Emergency workers are currently on the scene, tending to wounded and attempting to contain the situation. In response to the attack, Police Superintendent Chris Adams released the following statement: “Our thoughts are with those who lost their lives today, and the families

affected. We are currently investigating the cause of the attack and are working hard to ensure that everyone remains safe.”

We will keep you updated with further information as it comes to light.”

“Holy shit! And just as we were talking about this stuff, too!” Dr. Nara remarked.

“Okay, wow,” Dr. Williams replied “I never expected to see news like that.”

Chapter 41 The Ani

Two days after our little hike, Rosral appeared in our lab once more. And again, in the middle of the day. Well, at least our day. We were still managing to keep to our human sleep schedules, despite Beta’s very long days and nights. And we kept to Greenwich mean time as much as possible so as to be in sync with those who were still in London and the Sweden base of operations. Not that there were many who remained there.

We’d continued to follow the demonstrations on Earth and conversations on the internet.

Things were truly getting out of hand.

“Hi Rosral. Tell me we’re not going on another hike?” Dr. Williams stated as Rosral appeared.

“No,” Rosral replied. “Remember the superintelligence we showed you?”

“Yeah!” Dr. Kallas replied. “That was quite some time ago!”

“You asked to view our offensive against it,” Rosral stated.

“And I suppose that is happening now?” Dr. Williams replied. We’d all gotten used to the Eilanas way of informing people about things at the very last minute.

“Yes,” Rosral replied. “Are we that predictable?”

“A little heads-up would be appreciated,” Dr. Kallas stated.

“So, should we prepare for a surprise translocation?” Dr. Williams asked, standing up.

“No, we can watch it from here,” Rosral replied, walking over to one of the Eilanas devices in our lab. “I’ll tune us in.”

Rosral interacted with the console at lightning speed, as per usual. In moments, we were tuned into a ‘mission oversight’ channel. The whole team gathered around the holographic projection and watched as participants assembled in what looked like a rather grand auditorium. After a short while, official proceedings commenced. Rosral had already adjusted settings such that the audio feed from the event automatically translated all speech into English for us.

“This meeting will be chaired by a member of our alliance that you haven’t met yet.” Rosral stated. “The Ani.”

“The Ani,” Dr. Nara repeated.

“Indeed,” Rosral replied. “Their species head all strategic matters in our alliance. They are known for their exceptional planning and strategic thinking.”

A moment later, a being from a race we’d clearly not yet met stepped into view. It was a scaley, reptile-like species. Its visual appearance brought about an inbuilt primate sense of fear that was difficult to shake.

“Intelligent velociraptors,” Dr. Williams commented. Rosral didn’t apparently get the reference. Or perhaps she simply ignored Dr. Williams. Either was fine with us.

“They’re a very polite, cordial, logical, and generally calm species,” Rosral informed us. “Very good allies to have in military situations.”

We continued to watch the mission briefing. The Ani representative presented the same annotated star map we'd seen in our previous meeting with Sola. They then detailed the proposed military operation.

“In accordance with the size of the structures created by the artificial beings, a set of strategically placed implosion munitions will be used to ensure full eradication of all compute substrate therein,” the Ani stated.

“Implosion munitions create temporary areas of strong gravity, similar to conditions that occur during the formation of a black hole or neutron star,” Rosral informed us.

“The munitions will compress all substrate into super-dense pellets which will then be forced into high velocity trajectories towards the host star. This process will ensure that all matter comprising the superstructures is vaporized and subsequently absorbed by the star,” the Ani continued.

“This plan requires precision,” Rosral narrated. “All munitions must be delivered to each structure at precisely designated points and detonated within nanoseconds of each other. This all must happen simultaneously across the thousand or so structures detected in different star systems.”

“No margin for error?” Dr. Kallas asked.

“None,” Rosral replied.

“A cloaked fleet will jump to a reasonable and undetectable distance from each sphere. They will then fire their munitions. All munitions are equipped with faster-than-light propulsion. The fleet will then jump away. The whole operation should take just a few minutes to execute,” the Ani stated.

We noted how the console translated our units of measurement in addition to the Ani’s spoken language. A nice touch.

“Confirmation of the entire operation will be carried out using quantum spacetime inference,” Rosral informed us.

“Following the operation, each affected star system will be encapsulated in a time-dilation field, and closely monitored,” the Ani representative concluded.

“Why do it this way?” Dr. Williams asked. “Why not just translocate the substrate directly into the host stars?”

“When facing artificial beings for the first time, it is better to use conventional weapons and less complex tactics just in case the superintelligence survives and learns from the encounter,” Rosral replied. “Even though the planned attack will destroy all spheres within a matter of nanoseconds, that timeframe, from the point of view of a superintelligence, is equivalent to hundreds or even thousands of years of thought for us.”

“During those nanoseconds, the superintelligence will learn everything it needs about the technologies used against it, and how to defeat them,” Rosral continued. “But it won't have the time to physically create the necessary means to respond to the attack.”

“I see,” Dr. Kallas replied. “So, in this instance, the artificial being will learn about faster-than-light propulsion technologies and implosion munitions, but not more potentially useful technologies such as translocation, jump drives, stealth, jamming, and the like?”

“Correct,” Rosral replied. “Trust me, we’ve done this many times. We’ve learnt from our mistakes.”

“Automated monitoring systems and time dilation devices are scheduled to be left in all affected region for several years as a safeguard, and to monitor for any reoccurrence of this threat,” the Ani representative added. “Thank you for your time.”

After the Ani representative had concluded their presentation, the order to execute the strike was given. Rosral tuned a second holographic display into a quantum spacetime inference view of one of the targeted megastructures. A minute or so later, the munitions arrived from several different directions, and we observed a series of bright overlapping flashes. The resulting pellets generated by the implosion munitions were almost too small to see. Rosral zoomed in on one, and we followed its trajectory into the star. There was no visible effect in the host star as the pellet entered its atmosphere.

“Wasn’t that a considerable amount of matter shoved into that star?” Dr. Kallas asked.

“The megastructures contained approximately four point seven six to the nineteen kilograms of matter compared to the two to the thirty kilograms of matter in the host star,” Rosral stated. “As such, the ingestion of this additional matter produces no notable effect on it.”

“What about all the probes it sent out?” Dr. Williams asked. “Surely they’re something you also need to find and eliminate?”

“I understand we already took care of them,” Rosral replied. “They’re insignificant.”

“Yeah, but if you needed to precision-strike the main hubs of this superintelligence, what if the probes you took out in advance relayed a warning?” Dr. Williams asked. “Surely you should have taken everything out at the same moment?”

“The probes couldn’t carry the entire knowledge of the superintelligence with them,” Rosral replied. “They were small and insignificant. They were only designed to seed a new computational hubs.”

“Okay, I’ll take your word for it,” Dr. Williams replied. “But I still don’t see the logic in not dealing with everything at the same moment.”

The operation to remove the errant artificial intelligence was, ultimately, deemed a success. And shortly after the conference had ended, Rosral concluded our joint viewing session. We all made our way back to our habitation area and ended the evening in our usual fashion – sitting in the garden, discussing the day over some drinks and snacks.

“That was quite different to how Hollywood portrays these types of encounters,” Dr. Kallas stated.

“Yeah, if this had been an Earth film, some famous actor portraying a scientist would have found a way to upload a computer virus into the superintelligence to defeat it,” Dr. Williams replied.

“What, like those old ‘GUI interface using visual basic to track the killer’s IP address’ television shows?” Dr. Nara asked.

“Yeah! Exactly!” Dr. Kallas replied.

“But yeah, the notion that we might defeat an alien invasion or artificial superintelligence with a man-made computer virus is staggeringly unrealistic,” Dr. Williams stated.

“Think about the lengths we went to just to decipher a few simple computer files on Asir. And that was with the help of the Eilanas device,” Dr. Kallas stated. “Even after half a year's worth of research, we were unable to understand enough about the software running on one of those consoles to reverse engineer even a small portion of their operating system.”

“Let alone write a virus,” Dr. Williams added.

“These Hollywood films have such a shallow understanding of anything technical,” Dr. Kallas added. “It’s laughable. Let’s consider what a virus is. It’s a piece of code that, when executed on a system, does something undesirable. There are essentially two steps involved in performing a malicious operation on a computer. You first need to get the malicious piece of code onto the system, and then you need to execute the code.”

“Common techniques relevant to Earth computer systems involve tricking someone into launching the code. Like opening an email attachment,” Dr. Kallas continued. “Good luck tricking a superintelligence into opening an email attachment!”

“Another method would be to write the code to disk and then alter system settings to launch it after a reboot,” Dr. Nara added. “Or to inject it into a running process.”

“For the sake of argument, planting a virus in an alien ship would most likely require the latter,” Dr. Williams added. “Injecting the code into an existing process.”

“Right!” Dr. Williams replied. “In order to inject code into a running process, you must first discover a vulnerability in that process that allows the injection to happen. On Earth, security researchers use many methods to find vulnerabilities that can be exploited in such a way. And the reason why they’re able to find them is that they have access to a wealth of documentation and experience on the subject. We know, in detail, how our operating systems and applications work.”

“We often even have the code available,” Dr. Kallas replied.

“The process of finding vulnerabilities is difficult,” Dr Nara added. “That’s why they sell for a lot of money on underground markets.”

“Also, many vulnerabilities are introduced into programs via oversight, human error, and sloppy coding,” Dr. Kallas added. “While advanced aliens might still employ sloppy coders, an advanced artificial intelligence would be unlikely to make any mistakes whatsoever.”

“For us to find the necessary vulnerabilities in an alien computer system, assuming any exist, we would need to ideally recreate their computer systems, operating systems, and applications for ourselves,” Dr. Williams stated. “And we all know how difficult that is.”

“Let us assume, for a moment, that we do manage to recreate their computer hardware, operating system, and application software, find an exploitable vulnerability, find a way of interacting with that running process on their system, and inject our own malicious code into their running process,” Dr. Kallas stated. “We would still need to figure out what that malicious code needs to do in order to bring their systems to a halt, collectively, across the entire fleet.”

“Totally infeasible,” Dr. Nara stated. “But consider this. The inverse scenario would be highly possible.”

“True! If we were invaded by a highly intelligent species or a superintelligence, they would easily be able to reverse engineer our relatively simple systems,” Dr. Kallas replied.

“Of course,” Dr. Williams added, “via a combination of QUERY and low-level matter fabrication. They’d be able to wreak any manner of havoc on our own computer systems.”

“Absolutely,” Dr. Nara replied. “Earth’s computer systems contain plenty of both known and undiscovered vulnerabilities. And many critical systems on our planet remain unpatched against known and sometimes rather old vulnerabilities.”

“Which is why news about cyber attacks is almost constant,” Dr. Kallas added.

“An artificial superintelligence would likely find every vulnerability in every piece of software and hardware on Earth in seconds by simply simulating both the hardware and software in its own computational substrate,” Dr. Williams added.

“However, any species or intelligence that took the trouble of coming all the way to Earth would have a multitude of more efficient methods to destroy us,” Dr. Nara stated. “Hacking our computers would likely not even be considered.”

“Exactly!” Dr. Williams replied.

“So, John, have you started writing your account of events?” Dr. Williams asked.

“Actually, I have,” I replied. “There’s been plenty to write about!”

“I’d say,” Dr. Kallas replied. “Not in my wildest dreams would I have imagined things to turn out the way they have.”

“Me neither!” Dr. Nara replied. “You should continue to document this. It’ll be fantastic!”

“None of them will ever read this far,” Dr. Williams stated. “Trust me.”

“We’ll just have to see,” I replied. “Maybe I’ll get lucky.”

“There has to be someone out there who isn’t picky,” Dr. Kallas said.

“Don’t listen to Riks,” Dr. Madson replied. “I’m sure your account of events will be engaging. I’ve seen your writing.”

“What do you think, Rosral?” Dr. Nara asked.

“We don’t have processes like that here on Beta,” she replied. “If you write something compelling, it will end up in the cultural archives for everyone to enjoy. Your culture makes no sense to me.”

“So, the bar for entry into the cultural archives is pretty low?” Dr. Williams asked in a sarcastic tone.

“You made it into the cultural archives. Naked, if I recall,” Dr. Nara stated.

“Oh, come on! It was the mushrooms!” Dr. Williams replied.

“We all ate them. You were the only one who took his clothes off and danced naked in front of hundreds of onlookers,” Dr. Nara replied.

And for a brief moment, I think I actually saw Rosral laugh.

Chapter 42 Meltdown

“Have you seen the latest from Earth?” Dr. Kallas exclaimed as he rushed into our lab.

“No, sorry, I’m focused on work right now,” I replied.

“There have been multiple explosions at the locations of backbone routers across the globe,” Dr. Kallas stated, slightly out of breath. “Apparently, large parts of the Internet have been knocked out.”

“Wait, what?” Dr. Williams replied. “It would take dozens if not hundreds of simultaneous explosions to do that.”

“Yes,” Dr. Kallas replied. “That’s what they’re saying. Look!”

Dr. Kallas tuned one of our Eilanas devices into a television news feed from Earth.

“Good evening. This breaking news just in.

There have been dozens and possibly hundreds of simultaneous explosions reported throughout the world’s key Internet backbone routers. As a result, much of the Internet has been knocked out.

Emergency services are responding and are currently assessing the damage. So far, the cause of the explosions and the extent of the damage to the routers remains unknown. Eyewitnesses at some of the sites have reported large explosions and fires, which could suggest an act of sabotage or terrorism. So far, no group or individual has come forward to claim responsibility for the attacks.

The Internet blackout has caused disruption across the world, with many websites being inaccessible and global online communication coming to a standstill. Financial markets have already halted trading in light of these events.

Extra security personnel have been mobilised to the impacted sites and communications have been set up with federal agencies across the world.

We will bring you more on this breaking news as we get it.”

“I wonder how people will adjust to not having the internet?” Dr. Williams remarked.

“Oh no! All those kids with their smart phones and wearables won’t be able to post selfies and doomscroll social media today,” Dr. Kallas replied.

“On the upside, these fascists will have trouble coordinating their riots,” Dr. Nara replied.

“It’d be funny if they were the ones who did this,” Dr. Kallas replied. “They’ll have caused a denial of service on themselves.”

“An own goal. That wouldn’t surprise me in the least,” Dr. Williams replied. “I mean, it’s not like they consider the consequences of their own actions.”

“This is going to be a classic case of fuck around, find out,” Dr. Nara replied.

“This will cause some serious chaos, though,” Dr. Madson noted. “Bank machines won’t work. Card payments won’t either. The whole economy will stop. People will run out of food. There will be looting by this afternoon.”

“It looks like they’re already cancelling trains and flights,” Dr. Nara added, browsing her blue card.

“Shipments will be affected, too,” Dr. Williams added. “Petrol stations will run out. I bet people are already panicking and rushing to gas stations.”

“And medical supplies,” Dr. Kallas added. “Hospitals will be impacted.”

“I wonder how long it’ll take to fix all those routers?” Dr. Madson wondered.

“It’ll take more than a day or two. For sure,” Dr. Nara replied.

“There will be riots if they don’t fix things quickly,” Dr. Kallas replied.

“There already are riots!” Dr. Nara replied.

“They say that humanity is only three meals away from revolution,” Dr. Williams stated.

“This crisis may put that hypothesis to the test.”

“Guys, there’s more breaking news,” Dr. Nara stated.

“This is a breaking news update.

Multiple explosions have been reported at power stations and relay stations around the world. Reports indicate that the blasts have occurred at locations across Europe, North America, Asia and Africa.

The explosions come on the heels of news that internet infrastructure was attacked earlier today. It is unclear whether the two incidents are related.

A spokesperson for the Metropolitan Police has issued the following statement “At this time, we are collecting information about the explosions and any potential links to the earlier reported attack. We ask that anyone with information contact their local police.”

Jeff Lewis, Member of Parliament for Bridgewater and West Somerset has issued the following statement “We take this incident extremely seriously and are investigating all avenues to determine the possible causes of the explosions. We will keep the public informed as new information becomes available.”

We will continue to follow this story and report updates as they become available.”

“Okay, wow! Shit just got real,” Dr. Nara remarked.

Chapter 43 Compromised

It was just a day or two after learning about events on Earth that Dr. Nara received an alarming email.

“Hey, John, come check this out,” Dr. Nara stated.

I made my way over to her work area. “I just received this email. It’s from a journalist. I checked it out and the source looks legit,” she said.

“Wait, this is from Jen Starral. The journalist that connected the dots on our leaked papers,” I replied. “So, she’s asking to meet you in a restaurant near our Swedish facility. This afternoon.”

“Yeah, and look here,” Dr. Nara added. “Not only does she know about the Swedish facility, she claims to have more information that she won’t share with us over email.”

“Her knowing about the Swedish facility isn’t of great concern,” I replied. “I’m surprised knowledge about that place hasn’t already leaked. It’s what she’s not telling us that’s worrying.”

“She states that she’s planning on publishing either way,” Dr. Nara replied. “But she’d like to talk to us first.”

“I guess we’re eating lunch out today,” I replied. “Let’s get our coats. It’ll probably be cold there.”

Dr. Nara and I used the translocation hub to return to the Swedish facility and then drove to the nearby restaurant. It was in a very small shopping area buried in a residential district. Jen recognized us as we entered the restaurant and waved us over. We grabbed some food from a buffet table and took seats in a booth to one side of the place.

“Jen Starral, senior reporter at Vice.”

“Dr. Kano Nara, researcher.”

“Dr. John Stall, also researcher. Pleased to meet you. We’re familiar with some of your work.”

“Are you based in the US?” I asked.

“No, Dublin, Ireland,” Jen replied.

“Ahh, yeah, I can hear it in your accent now. Are you from Dublin?” Dr. Nara asked.

“I’m from Cork. Originally,” Jen replied.

“You learn something new every day!” I remarked.

Jen had pale skin, bright blue eyes, and freckles scattered across her nose and cheeks. Her long fiery red hair was fashioned into thick, loosely tied braids. She looked to be in her mid

thirties and was quite a tall woman with an athletic build. She had a very pronounced Irish accent.

“The piece about the anonymous research papers?” Jen asked. “I thought you might be. I suppose you had a hand in those?”

“I can’t comment on that, I’m afraid,” I replied.

“Okay, let’s put a pin in that for now,” Jen replied. “And anyways, you’re probably going to be more interested in the other things I’m going to be writing about.”

“Yes, do tell us more,” I replied.

“Well, for one, I know about your secret facility down the road from here,” she replied. She pulled a stack of photos from her bag and placed them on the table in front of us. The photos depicted me, Dr. Nara, other members of our team, and other researchers, also now on Beta, coming and going from the facility. They would have almost definitely been taken weeks earlier, before we moved to Beta.

“These are quite old photos,” I replied. “But there’s nothing secret about that facility. It’s simply a research center. A few labs, a handful of scientists. Nothing more.”

“Interesting you should say that, considering the security measures you have in place,” she replied. “I also know that the facility is way bigger than you’re making out. It’s a huge

underground complex. And you have alien tech down there, including some sort of transporter device.”

“Some of our research is for the military. They insist on such security precautions,” I replied.

“As for reports of deep underground facilities and alien tech, you might want to put a little less faith in the tabloids.”

“Cut the crap, John. You and I both know I’m not getting this from the tabloids. To be clear, I’m going to give you three words. Beta. Vedess. Eilanas,” she replied.

Dr. Nara gasped.

“Okay, I’m going to have to stop you there,” I replied. “We need to continue this conversation somewhere a little more private.”

We left the restaurant and drove back to the facility. I checked Jen through security as a guest and brought her down to our old lab. It had never really occurred to me, but given that the facilities had been constructed by the Eilanas and were full of technologies they'd provided for us to study, the place did indeed look like some sort of alien research facility. When we arrived, Jen gasped.

“What the hell is all this stuff?” she exclaimed. “And what are these walls made of?”

“You’re going to love this next bit, then,” I stated. “Step onto that pad over there and press the button on the console.”

Jen did as I had instructed. Dr. Nara and I followed. We arrived in our lab on Beta.

“Umm... Where the bloody hell are we?!?” she asked.

“The city of Vedess. On the Eilanas home world of Beta,” I replied. “Here, come outside with us. I think you’ll be surprised.”

We led Jen out of our lab, through the corridor, and out of the entrance to Seris 14.

“Jesus Mary and Joseph!” Jen exclaimed. “My information source said nothing about an alien planet. How far away from Earth are we?”

“One point four billion light years, give or take,” Dr. Nara replied.

“Wait, what?” Jen replied. “We teleported one point four billion light years in an instant?”

“They like to call it translocation here,” Dr. Nara stated. “But yeah.”

“How long have you been coming here?” Jean asked.

“We’ve been living here for about a month,” Dr. Nara replied. “But our first trip here was, like, six months ago.”

“Living here?” Jen asked. “You live here?”

“Yep!” Dr. Nara replied. “Beats that shithole we call Earth.”

“No shit,” Jen replied. “I can imagine.”

While Dr. Nara and Jen were talking, I’d contacted Rosral to inform her of the situation. She translocated right in front of us a moment later.

“Wha?!?” Jen gasped. “Isn’t that the alien...”

“From the leaked video?” Dr. Nara replied. “Yes. Jen, I’d like to introduce you to Rosral.”

“Umm. Hi? Do I shake your... hand?” Jen exclaimed.

“No need!” Rosral replied. “Kano usually hugs me. But there’s no need for that either.”

“Wait, that’s not your real voice, is it?” Jen asked.

“No, it’s a translator,” Rosral replied. She switched it off for a moment and spoke in her own language. “That’s what I would sound like without it,” Rosral added.

“So, this is your planet?” Jen asked.

“Well, not mine personally, but yes, it is the home world for my race,” Rosral replied.

“Would you like to see more of it?”

“Umm. Yeah!” Jen replied.

Rosral took us on a tour of Vedess. We started by translocating to the upper platform of Seris 8. The place we’d first landed when we arrived. Jen took in the picturesque panoramic views of surrounding ocean and wilds. We then took a trip to the underwater portion of the city and strolled through its endless transparent corridors and viewing domes. We showed her a habitation space, where Dr. Nara excitedly demonstrated the mouthwash dispenser. Jen tried it and was as amazed as we were. We finished the tour at Mikato market, where Rosral explained its history once more and we sampled food from a few of our favorite stalls.

After the tour had concluded, we took Jen to the gardens outside our habitation where we’d spent most evenings since we moved to Beta.

Rosral summoned a few bottles of Sec and some glasses. She offered one to Jen.

“It’s called Sec,” Dr. Nara explained. “It’s just like bubbly. Only better.”

“I’m not sure,” Jen said. “I’ve a lot of travelling to do tomorrow.”

“Worried about getting a hangover?” Dr. Nara asked.

“Yeah,” Jen replied.

“You can’t get one here,” Dr. Nara replied. “There’s an anti-hangover field.”

“Anti-hangover field?” Jen asked. “Bloody hell really?”

“Trust us,” I replied. “It works.”

Jen took the glass and cautiously drank from it. “Oh, that IS good!”

“John, I have a confession to make,” Jen said. “I honestly thought that information I’d received was a joke. I wasn’t expecting any of it to be real. The real purpose of my visit was to follow up on the article I wrote earlier this year.”

“What, really?” I replied.

“Yeah. I got those words Beta, Eilanas, Vedess from some crackpot looking email. I wasn’t expecting them to mean anything to you,” she said.

“But you tried them anyway, just to see if they’d put me off balance?” I asked.

“Basically, yeah,” she replied.

“So, I didn’t have to show you any of this?” I replied.

“I guess not,” she shrugged. “But now you’ve shown me all of this, I imagine you’re going to have to kill me?”

“Kill you?” I replied. “No! I showed you this stuff to convey the importance of our project, of our collaboration with the Eilanas. I was hoping to talk you out of publishing your story.”

“There never was a story,” Jen replied. “But now there is.”

“Are you saying you’re going to return to Earth and write about what you’ve seen here?” Dr. Nara asked.

“I’d rather not,” Jen stated. “Let me stay here instead.”

“Rosral, is that possible?” Dr. Nara asked.

“Of course,” Rosral replied. “We deal with requests like Jen’s all the time. We even have formal processes to handle such eventualities.” Rosral pulled out her green card and clicked around for a bit. Suddenly another Eilanas appeared near us.

“This is Pihi,” Rosral stated. “He works with the cultural council.”

We all greeted Pihi.

“Jen, I understand you’re a journalist?” Pihi asked.

“Yep, that’s me,” she replied.

“The cultural council always like to welcome new journalists. Would you be interested in joining our department?”

“Umm. Yes!” she replied. “When can I start?”

“Whenever you’re ready,” Pihi replied.

“How about now?” Jen replied.

“If you wish. Our facilities are in Vooris. We can translocate there now if you wish,” Pihi stated.

“Vooris? You’re gonna love that place!” Dr. Nara stated.

We all wished Jen good luck. She thanked us wholeheartedly for our help and for trusting her. We promised to keep in touch. And then she was gone.

Chapter 44 Trivia

Things had gone back to normal on Beta, what with the AI superintelligence being taken care of. And our encounter with Jen had been interesting and enlightening. According to Dr. Nara, who’d kept in touch with her, Jen had quickly settled into her new job in Vooris. And she was more than happy about her new situation. To be honest, our encounter with Jen had gone way better than we’d imagined.

A couple of whole days had passed on Beta, and we were, once again, sat in our garden at the end of a research shift. Time for some idle chat, snacking, and, of course, Sec.

“I love how clean and quiet it is here,” Dr. Madson stated.

“Yeah! No cars. No noisy machinery. No pollution,” Dr. Nara replied.

“It’s nice how they don’t even need vehicles at all here. You can translocate anything to any place,” Dr. Kallas added.

“Or just materialize it,” Dr. Williams added.

“Honestly, it feels like a perpetual vacation here,” Dr. Madson stated. “I’ve been freed from the worries, noise, and hardships of Earth. I feel like I’m living a healthier, more stress-free life.”

“Yeah, me too!” Dr. Nara replied.

“Even though I can translocate almost anywhere, I like to walk places,” Dr. Madson remarked. “I often take different routes just to see different things.”

“Me too,” Dr. Nara replied. “And the locals have really warmed up to us recently.”

“Do you think it’s because they got used to seeing humans about?” Dr. Kallas asked.

“Could be that. Or it could be because Jen is on their TV now,” Dr. Williams noted.

“Yeah! How cool is that! She’s a TV news reporter!” Dr. Nara replied.

“I like it when a local comes up to me and tries to mimic her signoff catch phrase,” Dr. Kallas replied. “Thanks for watching! I’ll see youse soon!” trying to mimic an Eilanas mimicking an Irish accent.

“Oh god, that was an awful impression,” Dr. Madson stated. “Don’t do that in front of Rosral. It’ll probably offend her!”

“Talking of Rosral, where is she?” Dr. Nara asked.

“Apparently she’s got some urgent thing she needs to attend,” I replied. “She said she’d join us later.”

“Ahh, okay,” Dr. Nara replied.

“Amazing to think that close to one hundred million live in this city,” Dr. Kallas remarked.

“Can you imagine that on Earth? The place would be a nightmare!” Dr. Madson replied.

“These Seris structures looked weird at first,” Dr. Nara stated. “More like fancy and ornamental than functional.”

“Yeah, I thought similar,” Dr. Kallas replied. “Turns out they’re designed in a very specific fashion. Areas under the shadow of the next higher tier are allocated for facilities and living spaces. Outdoor areas that receive a lot of light are always communal gardens.”

“Apparently the design is so that one never needs to travel too far to be in a pleasant outdoor space,” Dr. Madson replied. “Near nature.”

“The layout is also for efficiency reasons,” Dr. Williams noted. “Quick and easy access to home, work, food, and nature wherever you live,”

“And you don’t even need to go out for food,” Dr. Kallas replied. “Those fabricators are a godsend.”

“I certainly don’t miss going grocery shopping!” Dr. Madson replied.

“I’ve noticed some Eilanas growing things in their gardens,” Dr. Madson stated. “Fruits and vegetables, mainly.”

“So, do you guys mostly use your card for translocation, or the hubs that are dotted around the place?” Dr. Kallas asked.

“I prefer to use my card,” Dr. Williams stated.

“I use the hubs a lot now that I know where they are,” Dr. Madson replied.

“They’re sort of like elevators, but without the wait, travel time, or possibility of getting stuck between floors,” Dr. Nara added. “I do NOT miss elevators.”

“These domes are quite a mystery to me,” Dr. Williams stated. “I still have no comprehension as to how they work, even after looking over schematics and reading papers about them.”

“Apparently they were designed for three purposes,” Dr. Kallas stated, while reading an article on his blue card. “To provide climate control, to prevent the impact of storms on infrastructure, and to filter harmful radiation.”

“Well, yes, I knew that,” Dr. Williams replied.

“I was expecting to feel something when passing through, but I didn’t,” Dr. Madson replied. “It’s very strange how they keep wind and radiation out but let creatures, rain, and sunlight in. And yet they’re not made of any physical substance.”

“Membrane is the term I seem to remember Rosral using,” Dr. Nara replied.

“Have you guys explored the other commerce avenues around here?” Dr. Nara asked.

“You mean the ones where they’re selling stuff like books, music, clothing, painting, and crafts?” Dr. Kallas replied.

“Yeah! Those,” Dr. Nara replied.

“I always wondered why those exist,” Dr. Williams remarked. “I mean, you can fabricate almost anything you want. Why go shopping?”

“I think those are run by the cultural council,” Dr. Kallas replied.

“Why go shopping?” Dr. Nara replied. “Why not? And besides, those places provide new ideas for clothes, home décor, and stuff like that.”

“So how do they work?” Dr. Williams asked. “This is a society without money.”

“If you see something you like, you can just take it,” Dr. Madson replied.

“What if you want to take everything?” Dr. Williams asked.

“It’s based on an honor system. Only take what you need,” Dr. Nara replied. “They wouldn’t probably mind if you did take everything. But it would be frowned upon and you’d be considered a rude asshole for doing it.”

“People here are past the need for materialism,” Dr. Madson replied. “It works just fine.”

“They have video games,” I added.

“What, really?!?” Dr. Williams replied.

“I have a few machines in my habitation. Feel free to come and try them out,” I offered.

“Perhaps you could have some installed in your place.”

“I don’t have the room,” Dr. Williams replied.

“What do you mean you don’t have the room?” Dr. Madson asked. “Robert. What have you done now?”

“Nothing!” Dr. Williams replied.

“Okay, Robert. Up. Now,” Dr. Madson yelled.

We were all intrigued and followed Drs. Madson and Williams to his habitation space. He opened the door. The place was jam-packed with high-tech Eilanas lab equipment. And in the middle of the room was a large swivel chair surrounded by a rather grand workstation attached to three holographic projectors.

“Robert, what in the hell are you doing here?” Dr. Madson asked.

“This is where I work when I’m not in the lab,” he replied.

“And where’s your bed?” Dr. Madson asked.

“I dematerialized it to make space for this equipment. I sleep on that couch,” he replied, pointing at a small couch crammed into the corner of the room.

“Wow! This is an amazing setup!” Dr. Kallas exclaimed. “You must show me how to reproduce this.”

“Of course!” Dr. Williams replied.

“Riks, don’t give him more bad ideas!” Dr. Madson stated.

“I’m not. Anyway, Robert, what are you working on here? Looks interesting,” Dr. Kallas asked.

“I’ve found a way to interface with the blue card,” Dr. Williams replied. He placed the blue card onto a small black mat on the table and then activated the workstation. The three holographic projectors flooded the room with light. “I’m working on deciphering some of the more advanced features of this device,” he said while typing frantically at his keyboard.

“Do we leave them here?” Dr. Nara asked.

“No!” Dr. Madson replied. “Come on boys. Up. This is no time for work.”

We returned to the garden.

“I’m not sure I’ll ever get used to the long days and nights here,” Dr. Nara remarked. “That strange sensation of going to bed in the early morning, getting a good night's sleep, and waking up just before lunch on the same day.”

“I quite like the nights,” Dr. Kallas stated. “They’re so much livelier.”

“Yeah, I understand that the locals spend the days working and leave recreation for the evenings,” Dr. Madson noted.

As dusk would set in on Beta, the streets at ground-level in Vedess would start to become more crowded and noisier. During these night cycles, additional stalls, decorations, and small theatre stages would be constructed in parks across the city. The locals would then enjoy food and drinks while watching and playing their own music. They also performed a form of theatre that resembled Kabuki. Music was mostly vocally performed by groups of Eilanas. While some of it was soft and pleasant, their long performances would occasionally reach rather loud and screechy crescendos. We were currently in the night cycle, and there was quite a racket coming from the streets below.

“You enjoy all this noise?” Dr. Williams asked.

“Yeah, I prefer it to the quiet,” Dr. Kallas replied.

“Even that cat’s chorus?” Dr. Williams asked.

“Robert, we’ve heard you complain about their singing enough already,” Dr. Madson stated.

“And besides, I quite like it,” Dr. Nara added.

While we were talking, we noticed a small group of Eilanas on the same Seris platform as us. They were some distance away. We'd always assumed that this level had been sort of privately reserved for us, but experience had proven otherwise. The Eilanas kinda went where they pleased. We stopped talking and watched them for a moment. They seemed like they might be younger members of their species. Perhaps adolescents. They were drinking, making a lot of noise, and fooling around dangerously close to the edge of the platform.

"I can't even look!" Dr. Madson stated. "Oh god, they're going to fall off!"

"They do look a bit inebriated," Dr. Williams replied. "They don't seem at all worried about standing so close to the edge, there."

"Do you think we should go over and talk to them?" Dr. Kallas asked.

"I really rather wouldn't," Dr. Williams replied.

"Yeah, let's not interrupt them," I said.

Try as we might, though, we couldn't stop watching them. And then disaster struck, just as we'd feared. One of the Eilanas fell backwards off the platform. We estimated that the platform was a good fifty meters above street level. The Eilanas must have been, at the very least, seriously injured. Perhaps even dead. We all got up and started to run over to the other two, who didn't seem at all bothered by what had just happened. Before we arrived, the Eilanas who'd fallen, just moments before, translocated back onto the disc. They all started cheering.

We stopped.

“What the hell just happened?” Dr. Kallas exclaimed.

“Interesting, just as I hypothesized,” Dr. Williams replied.

“What did you hypothesize, Robert?” Dr. Kallas answered impatiently.

“The reason there are no barriers around these platforms is because there are safeguards against falling,” Dr. Williams replied. “Or, rather, from hitting the ground. I hypothesize that the Eilanas who just fell never hit the ground. They were translocated mid-fall.”

“That would make sense,” Dr. Kallas replied.

“An anti-accident field, you mean?” Dr. Nara asked. “Kinda like the anti-hangover field?”

“Like that, yeah,” Dr. Williams replied.

“So, that’s what the kids do to entertain themselves around here,” Dr. Kallas noted.

“I haven’t seen many entertainment facilities around here, come to think of it,” Dr. Madson replied. “Well apart from what’s going on down there.”

“Yeah, I’ve also noticed a lack of seedy joints,” Dr. Kallas noted. “You know. Gambling. Prostitution. That sort of thing.”

“Apparently all the seedy joints are on the eastern continent,” Dr. Nara stated. “Jen told me. She was there following up some leads or something. She told me she’s seen things that can’t be unseen.”

“I can’t imagine the Eilanas being depraved,” Dr. Madson replied.

“Apparently facilities on the Eastern continent cater to many species,” Dr. Nara replied. “I’m not sure the Eilanas are the ones who are depraved.”

“I’ve not seen all that many other species around,” Dr. Madson noted. “Humans. Eilanas. Lanass. And a few others around here that we’ve yet to be introduced to.”

“Apparently the Eastern continent is full of other species,” Dr. Nara replied. “Hundreds of them. Jen said it felt like Babylon Five there.”

“It occurs to me that I know very little about this planet,” Dr. Kallas stated. “Apart from Vedess and Voriss.”

“We all knew that there were three continents,” Dr. Madson stated. “I only recently learned their names. This continent is called Esivoro, the eastern one is Lasvoro and the northern one is Vileona.”

“Jen said she went to a city called Orlon on the eastern continent,” Dr. Nara added. “It’s apparently a twin city. The other is called Ionso.”

“Are those cultural or scientific?” Dr. Kallas asked.

“Apparently neither,” Dr. Nara replied. “They’re relaxation and recreation centers. Beach resorts and stuff.”

“That would explain the seedy joints being there,” Dr. Kallas noted.

“Did you know they only have three time zones here?” Dr. Nara asked.

“No, I didn’t!” Dr. Madson replied. “I’ve never had to communicate with anyone living elsewhere on this planet.”

“I only learned about them when I started talking to Jen,” Dr. Nara stated. “Each continent has its own time zone. It’s that simple. We’re on the western time zone. Voriss is central. And Lasvoro is eastern. I also learned about their local timekeeping. Apparently, a day on Beta is split into ten hours. Their word for hour is aikr. One aikr is about twelve Earth hours.”

“A decimal time system,” Dr. Williams replied. “I see they’ve embraced logic.”

“Rosral’s still not here. I wonder what’s keeping her?” Dr. Nara wondered.

“Maybe she forgot?” Dr. Williams stated.

“I wouldn’t imagine she did,” Dr. Kallas replied. “I don’t think I’ve ever seen her forget anything.”

“I hope the emergency meeting she’s in isn’t anything bad,” I stated.

“What, like another superintelligence threat?” Dr. Kallas asked.

“Yeah, something like that,” I replied. “Although they handled that seemingly impossible situation without any effort. I’m not too worried.”

“Yeah, me neither,” Dr. Kallas replied.

“Anyone for a refill?” Dr. Madson asked while materializing a bottle of Sec.

“What’s THAT?” Dr. Nara asked.

“Oh, I found the setting while fiddling around this morning,” Dr. Madson replied. “It’s a two-liter bottle.”

“Two liters? I didn’t know they came in that size!” Dr. Nara exclaimed. “Can you get me a bigger glass to go with that?”

“Coming right up!” Dr. Madson stated.

“Hey, do you remember those games we used to play when we first moved in?” Dr. Nara asked.

“The clothes fabricator game?” Dr. Kallas replied. “Oh yeah, very well.”

“Didn’t that start as a dare?” Dr. Nara replied.

“It did!” Dr. Madson noted. “We used to dare each other to fabricate and wear local attire. And then it became tradition at our little get-togethers.”

“The more awkward the attire, the more points you scored,” Dr. Kallas replied.

“It’s not like the clothes were bad,” Dr. Nara noted, “they suit the Eilanas very well. They just look awkward on humans.”

“Anyway, Robert is still the reigning champion!” Dr. Madson remarked.

“Wha?” Dr. Williams exclaimed. He was browsing his blue card and clearly hadn’t been paying attention to us.

“Do you remember the snack dare game?” Dr. Kallas said. “How did it go again?”

“Fabricate a random Eilanas snack and choose a contestant. They had to eat the snack. And then they got to choose the next snack and the next victim,” Dr. Madson replied.

“Oh god, some of those snacks were awful!” Dr. Nara stated.

“Yes, we all remember you puking on more than one occasion,” Dr. Williams added.

Apparently, he’d rejoined our conversation.

“One of those snacks tasted like worms. Or rat intestines, still filled with the food it had eaten,” Dr. Nara said.

“I’m glad I didn’t get that one!” Dr. Madson noted.

“In all fairness, a lot of the snacks were very good,” Dr. Kallas replied. “That drinking game, on the other hand...”

“Oh god,” Dr. Nara replied. “Some of those spirits were terrible.”

“I remember,” Dr. Madson replied. “Even the anti-hangover field didn’t save me from that experiment.”

“Me neither!” Dr. Nara replied. “I thought I was the only one who ended up suffering after that evening.”

“Oh god, remember that blue stuff?” Dr. Kallas added.

“It tasted like anti-freeze!” Dr. Madson replied.

“I still remember the taste of those anti-freeze spritzers we made,” Dr. Nara remarked. “Ugh! Never again!”

“We should gift McTavish a bottle of that blue stuff,” Dr. Madson noted.

“Are you trying to get us all fired?” Dr. Williams interjected.

The conversation paused momentarily while we refilled our glasses.

“Have you guys watched much of the local TV?” Dr. Madson asked.

“All the time!” Dr. Nara replied. “One of my favorite things is to lay in bed and watch it.”

“Me too!” Dr. Madson replied. “It’s so much fun to watch. Regardless of what’s on. I’ve been watching dramas, comedies, thrillers, informational shows. You name it.”

“There’s a distinct lack of science fiction, medical, and crime genres,” Dr. Kallas noted.

“That makes sense, though,” I replied. “Being here is like living a science fiction show. They clearly don’t need to practice medicine, since their translocation tech takes care of it. And, well, they don’t seem to have any crime. So, they probably don’t have a reference point for writing about it.”

“They do have interesting law programs,” Dr. Madson noted. “Well, not perhaps law, but deep discussions about ethics, regulations, morality, that sort of thing.”

“I think Eilanas science fiction and crime is an untapped source of potentially interesting fiction,” Dr. Kallas stated.

“Perhaps we should contact the cultural council and talk to them about that,” Dr. Nara replied.

“Let’s face it, most of their regular TV shows would be high science fiction on our planet,” Dr. Williams added.

“I don’t get their comedies at all,” Dr. Madson stated. “Even with translations turned on.”

We all nodded in agreement.

“Probably a cultural thing,” Dr. Kallas noted.

“But, hey, food TV,” Dr. Kallas remarked. “How good is that?”

“I think I’ve put on weight watching that,” Dr. Madson replied.

“I only found out about it last week!” Dr. Nara added. “No fair!”

“Wait, food TV?” Dr. Williams stated. “Like cooking shows?”

“Cooking shows, culinary expeditions, all that stuff,” Dr. Kallas replied. “Wait, you don’t know about those?”

“Food TV is everything we’ve ever dreamed about,” Dr. Madson replied.

“You know how watching Earth TV shows about food just leave you hungry and craving whatever the presenters are cooking or sampling? Here, food TV alleviates that problem entirely,” Dr. Nara stated. “There are loads of programs on Eilanas TV that demonstrate food preparation or follow a presenter through a culinary trip in an Eilanas city, region, or colony.”

“And the great thing about those food shows is the ‘try this at home’ option,” Dr. Kallas added.

“Rachel figured it out,” Dr. Nara added. “She recognized the Eilanas glyphs.”

“Yeah, so, at various points during the show, when the food has been prepared and the host is sampling it, a ‘try this at home’ option appears on the screen,” Dr. Madson stated. “Just select ‘yes’ and a portion of the dish materializes in your food fabricator.”

“Are you serious?” Dr. Williams replied. “And how long have you known about this?”

“I figured it out a few weeks ago,” Dr. Madson replied.

“And you didn’t think to tell me about it?” Dr. Williams whined.

“I was meaning to tell you, but you’re always too busy working or playing with your computers and gadgets,” Dr. Madson replied.

“Most of the foods I’ve tried from those shows have been amazing,” Dr. Nara stated.

“I’ve had the occasional miss,” Dr. Kallas added.

“I normally hate cooking shows BECAUSE they make me hungry,” Dr. Williams remarked.

“I’m definitely going to watch them here. Hmm. I wonder if this tech could be adapted for Earth TV?”

Rosral didn’t show up that evening. But we kinda didn’t notice. We’d all become tired. And drunk. And shortly thereafter, we retired to our habitation spaces and fell asleep.

Chapter 45 Resistance is futile

We convened in our lab the following morning. Halfway through the morning we stopped work to chat over coffee and some sweet Eilanas snacks called Bvisp. They reminded me of fig rolls.

“Do we know if they found the insider yet?” Dr. Madson asked.

“Not that I’ve heard of,” Dr. Williams replied.

“It’s been a few weeks already,” Dr. Madson noted.

“Yeah, but there’ve been no more leaks,” I replied.

“That we know about,” Dr. Williams added. “They might be out there but not published yet.”

“I think Earth has more pressing issues than alien leaks now,” Dr. Madson replied.

“Did they manage to fix all the damage from those explosions on Earth yet?” Dr. Kallas asked.

“Not from what I’ve been reading,” Dr. Nara replied.

“It’s been, what, almost two weeks since those attacks?” I asked.

“Yeah!” Dr. Nara replied. “They’ve fixed some of it, but from what I’ve been reading, the situation is starting to look like Mad Max. At least in the US. And parts of Europe.”

“From what I heard, whoever carried out those attacks knew exactly what they were doing,” Dr. Madson added. “There aren’t enough spare parts to fix everything. Significant portions of the US, Europe, and Asia are still without power. Let alone internet. Banks are still shut. Markets are crashing. There’s no petrol, food, electricity, or even water in many places.”

“Everything I predicted,” Dr. Williams noted. “And I’d bet it’s playing right into the hands of the irrationalists.”

“Oh, it is!” Dr. Nara replied. “Look at what’s going on in the US. Those crazies with basements full of weapons have formed organized militias in response to martial law. They’re fighting against their own people.”

“Are we talking civil war?” Dr. Madson asked.

“Nobody’s saying it out loud, but it’s starting to look like it,” Dr. Nara replied.

“Those crazies have been pushing for a civil war for years,” Dr. Williams said. “Looks like they got what they wanted.”

“I’d always hoped there weren’t as many of them as we feared,” Dr. Kallas replied.

“Aren’t there, like, two and a half guns per household in the US?” Dr. Madson asked.

“Something like that,” Dr. Nara replied. “There’s been a massive buy up of guns and ammunition since the beginning of the twenties. They’ve always been preparing for this moment.”

“I heard rumors that those guys also got their hands on Spectre drones,” Dr. Williams added.

“That wouldn’t surprise me in the slightest. They’ve always had plenty of allies in law enforcement,” Dr. Nara replied.

“That’s some pretty frightening tech in the hands of the wrong people,” Dr. Kallas remarked.

“The military has drone jamming tech,” Dr. Nara stated. “But it shuts their own drones down, too. I understand it’s a lose-lose scenario, since they rely on those drones for surveillance.”

Dr. Nara pulled up some footage of skirmishes on the outskirts of Washington DC. What had once been a peaceful suburban residential area now looked like a war zone.

“Let’s hope there aren’t any new leaks,” I replied. “I’d really rather not visit Earth right now.”

“What, you mean yet another summons from McTavish?” Dr. Madson asked.

“If that lazy fat git won’t use the translocator, perhaps we should just ignore his summons,” Dr. Williams replied.

“What, and get fired?” I replied.

“Would you even care at this point?” Dr. Williams replied. “We’re here on Beta. We don’t need money or grants or a position in academia. I bet we’d be able to continue with our research with or without the support of the university.”

“Robert has a point,” Dr. Kallas stated. “We’re pretty self-sufficient here.”

“We are!” Dr. Nara replied. “And why are we always working so hard? We should take a leaf out of our hosts’ book.”

“When in Rome?” Dr. Kallas asked.

“Exactly!” Dr. Nara replied.

Rosral appeared in our break room.

“ROSRAL!” Dr. Nara screamed.

Rosral flinched like she was expecting a flying hug from Dr. Nara.

“We were just talking about you,” Dr. Madson remarked.

“Nothing bad, I hope,” Rosral replied.

“Nah, we were talking about how we should embrace the local culture more,” Dr. Kallas replied. “You know, take it easy.”

“What? You think our race is lazy?” Rosral asked. She gave Dr. Kallas an angry stare.

“No! No! That’s not what I meant!” Dr. Kallas replied in a fluster.

“What Riks was trying to say is...” Dr. Madson added.

“Are you guys really still falling for my obvious jokes?” Rosral remarked.

“I knew she was joking,” Dr. Williams stated. “I just wanted to watch Riks squirm.”

“Good for you, Robert,” Dr. Kallas replied.

“Pull up a seat, Rosral!” Dr. Nara said.

“We don’t have time to chat right now. There’s a bit of an emergency,” Rosral replied.

“We were just talking about the situation on Earth,” Dr. Madson stated. “Do you mean the Eilanas are going to help out now?”

“The situation on Earth doesn’t concern us,” Rosral stated. “What I need to show you is far more important.”

“Another superintelligence threat?” Dr. Kallas asked.

“You might say that, yes,” Rosral replied.

“Do those threats really pop up so often?” Dr. Williams asked. “How bad are we at monitoring the universe?”

“It’s not a new one,” Rosral replied. “It seems our previous operation failed. We didn’t eliminate all the computational substrate.”

“How is that possible?” Dr. Kallas asked.

“Apparently, the superintelligence had developed a method to spoof QUERY readings,”

Rosral replied. “The mechanism was only in use in a portion of their propagation nodes. Our scans missed those completely.”

“I see,” Dr. Williams replied. “So, what you’re saying is that they evaded your anti-jamming mechanisms.”

“Correct, Dr. Williams,” Rosral replied. “One of our allies discovered unusual quantum spacetime inference readings in a system adjacent to those where the original threat was located. We adjusted our devices. We can now see the previously hidden object.”

“We only missed one?” Dr. Kallas asked.

“That’s what we were hoping,” Rosral replied. “But after scanning additional systems in the vicinity, we identified dozens more. And then hundreds more.”

“I assume we’re going to mount another similar operation against those,” Dr. Madson replied.

“The tactics we used before will not work again,” Rosral replied. “The superintelligence learned from our previous offensive.”

“We’re now facing a two-point-zero version of this thing,” Dr. Williams noted.

“Correct again,” Rosral replied. “The nodes that remained have built defenses. And they’ve adapted.”

“Adapted?” Dr. Kallas asked. “In what way?”

“The new version expands more aggressively,” Rosral replied. “Their faster-than-light drives are an order or magnitude better than their old ones. The core hubs now construct and send out propagation nodes that arrive in new systems within hours. When a propagation node arrives at its destination, it fabricates thousands of small drones that harvest materials to construct new hubs. Both the hubs and propagation nodes are now equipped with defensive shields. Oh, and they are also constructing other space-borne megastructures.”

“What do those other megastructures do?” Dr. Kallas asked.

“We don’t yet know,” Rosral replied. “We hypothesize that they may be defensive structures. Shields or automated weapons arrays capable of repelling our munitions.”

“This doesn’t sound good,” Dr. Nara remarked. “Have you ever had to deal with a two-point-zero superintelligence before?” she asked.

“Not for a very long time,” Rosral replied. “This is a non-trivial threat. Failing to eliminate it this time is not an option. We’ve never faced a three-point-zero superintelligence. We hypothesize that such a threat may be impossible to contain. It could mean the end to all life in the universe.”

“If this thing is spreading quickly, aren’t we in a bit of a hurry to deal with it?” Dr. Kallas asked.

“We are,” Rosral replied. “We have already contacted a number of other alliances for help.”

“So, what happens now?” Dr. Madson asked.

“We must first carefully identify every last hub, propagation node, drone, and nanoparticle that belongs to this new superintelligence,” Rosral stated. “They may also be using other spoofing technologies. We are exploring methods to detect them.”

“Is there anything we can do to help?” Dr. Williams asked.

“Nothing at the moment,” Rosral replied. “But I’ll keep you informed.”

Rosral translocated away. Dr. Williams got up out of his seat and hurried out of the break room.

“Where are you going in such a hurry?” Dr. Kallas asked.

“I think I know how to bring up images of this new thing from the central archives,” he yelled.

We all followed him into the lab. He was already working at one of the Eilanas devices.

“As I suspected,” he said as we walked in. “All Eilanas devices update centrally. This one already contains the anti-spoofing tech.”

Dr. Williams brought up a QUERY scan of a system inhabited by the two-point-zero superintelligence. We could see that it was in the process of constructing a layered star-powered substrate shell around the host star. It wasn't yet finished. Millions of tiny drones swarmed around the structure. We observed it building in real-time.

“Damn, that's fast,” Dr. Kallas remarked.

“It is,” Dr. Williams replied. “It will take a volume of matter close to that contained in our entire inner solar system to construct it.”

“Kinds looks like the Death Star,” Dr. Nara remarked.

“Except that it's a tad bigger,” Dr. Kallas replied.

We noticed another object in the system. It was spherical in design and glowed a sort of blue-green color. It wasn't that large. Maybe a few kilometers in diameter. Dr. Williams zoomed in on it. The device had an opening in it. New drones could be seen pouring out of the opening at a frightening rate.

“This must be the propagation node that Rosral mentioned,” Dr. Kallas remarked.

“I wonder what that glow is,” Dr. Nara remarked.

“Shields, maybe?” Dr. Kallas posited. “Rosral mentioned shields.”

We watched as the layered computational substrate was constructed. It was mesmerizing. After it was finished, a similar blue-green glow started to emanate from the sphere.

“Almost definitely shields,” Dr. Kallas remarked.

We then noticed that a new structure was being built. It was shaped like a ring.

“Look! They’re constructing a stargate!” Dr. Kallas remarked.

“It does look like that, doesn’t it?” Dr. Nara replied. “Minus the symbols.”

We all turned to Dr. Williams, expecting a snide remark. He didn’t bother.

“Are you feeling alright, Robert?” I asked. “We’ve had references to both the Death Star and a stargate, and you haven’t said a word.”

“You guys use references to sci-fi literally all the time now,” he replied. “I can’t be bothered to comment on them anymore.”

“Could that be because some of those references ended up proving your long-held hypotheses invalid?” Dr. Kallas asked sarcastically.

“Don’t wind him up,” Dr. Madson said. “This situation actually looks quite serious.”

“I’m not sure I’ve ever seen Rosral act so serious,” Dr. Kallas stated.

“It’s almost like she’s worried about this situation,” Dr. Nara added.

“If she’s worried, we should be,” Dr. Williams stated.

“Kinda puts things back on Earth in perspective,” Dr. Madson remarked.

“Yeah, and they have no idea what’s going on out here,” Dr. Kallas replied.

“I wonder if they’d stop their petty bickering if they knew?” Dr. Madson posited.

“Not blood likely,” I replied.

We watched the superintelligence complete the ring structure. It started glowing blue-green.

Drone activity ceased.

“I wonder what that thing does?” Dr. Madson remarked.

“Whatever it is, it’s not doing it right now,” Dr. Kallas replied.

“They seem to have stopped building,” Dr. Williams noted.

“Wait, something’s happening,” Dr. Nara noted.

The propagation node floated over to the ring structure. It stopped for a moment. And then it passed through the center of the ring. A bright flash occurred. And then the propagation node was gone.

“See, I told you!” Dr. Kallas exclaimed. “It was a stargate!”

“Where’s the puddle, then?” Dr. Williams asked.

“Wait, you’re actually interacting with my sci-fi reference?” Dr. Kallas replied, startled.

“Yes,” Dr. Williams replied. “So, where’s the puddle?”

“I think it’s obvious. Don’t you? They’ve clearly developed a more advanced stargate that doesn’t require a puddle to be formed at the event horizon,” Dr. Kallas replied.

“Stargate theories aside, what just happened?” Dr. Nara asked.

“Actually, I believe the stargate theory was sound in this case,” Dr. Williams stated. “I’m going to take a guess that this thing is some rudimentary form of jump drive.”

“What makes you think that?” Dr. Madson asked.

“We know the propagation nodes are capable of faster-than-light travel. On their own. If it were going to use that mechanism to move to its next location, why pass through the ring first? It could have just zoomed off from where it was sitting,” Dr. Williams replied.

“Interesting hypothesis,” Dr. Kallas remarked.

“But if they now have jump drive, doesn’t that mean that they can essentially spread across the entire universe?” Dr. Nara asked.

“It does,” Dr Kallas replied.

“Correct me if I’m wrong, but doesn’t that mean its next destination could be Earth? Or here?” Dr Madson asked.

“Oh crap, Rachel’s right,” Dr. Nara noted.

“I’d imagine they have defenses against that thing here,” Dr. Williams stated. “We’re probably safe.”

“Yeah, but Earth doesn’t,” Dr. Madson replied. “It’ll get wiped out in seconds.”

“The number of stars in the universe is unimaginably large,” Dr. Williams stated confidently.

“The chances of that propagation node randomly choosing Earth or here as its next destination is remo... Wait something’s happening.”

We watched the screen. Drones started streaming out of the computational hub. Within seconds, a new propagation node was assembled. It moved through the ring. Another bright flash occurred. And then another node was formed. It blinked through the ring. And then another. And another. And another.

“Okay,” Dr. Williams exclaimed. “We’re all screwed.”

“There’s really nothing they’re going to be able to do about this is there?” Dr. Madson remarked.

“If all those other hubs are doing this, as we can safely assume they are, this thing is going to go exponential. If it hasn’t already,” Dr. Kallas stated.

“Hang on,” Dr. Williams interjected. “There’s another war strategy session convening. I’ll tune us in.”

Dr. Williams moved over to another Eilanas device and tuned into the proceedings. We could now watch both things at once – the threat and the response to it.

“This should be interesting,” Dr. Kallas remarked.

“Maybe we’ll learn how frighteningly advanced these allies of ours are,” I remarked.

The session was hosted, once again, by the Ani strategist who’d hosted the proceedings we’d watched weeks earlier. These new proceedings were hosted in a much larger chamber. We

saw many races we'd never seen before. Including a race we thought might be the grays Rosral had alluded to. We also saw what looked like the Enu.

"The number of systems affected by this threat have rapidly grown over the past few hours. We estimate at least thirteen thousand so far. That number will have grown by the time I finish this sentence," the Ani stated.

"Do we have a plan?" one participant asked. We didn't recognize its race.

"We do," the Ani replied. "The plan is as follows. All affected systems will be marked immediately after this meeting is adjourned. The Enu will remotely deploy solar system destroyers to all marked targets. The Ashki will subsequently deploy black hole generators to those systems to absorb any remaining substrate. The Eilanas have already deployed capture net fields around all affected systems. These will be activated the moment the attacks start and should ensure that any propagation nodes attempting to jump out are destroyed. Finally, the Reen will deploy their particle swarm generators to mop up any remaining nanoparticulate matter."

"This sounds like a dubious plan," a member of the audience remarked. "What is the probability of success?"

"Given our limited time to respond to this threat, we estimate our chances of success to be around eighty percent," the Ani replied.

"Is there no way of improving those odds?" they asked.

“Not in the limited time we have,” the Ani replied. “If we allow this threat to continue expanding for another hour, we’ll be spread too thin to respond to it.”

“Very well,” they replied.

“Votes in favor to proceed?” the Ani announced. A running tally of votes showed up in the feed. Within less than thirty seconds, all votes were in. The result was seventy six percent in favor of the action.

“Very well,” the Ani stated. “Proceed with the attack.”

We turned back to the other console to watch. Dr. Williams zoomed out a bit. Propagation nodes continued to blink, one after the other, through the ring structure.

“I wonder if we’ll see the effects of that capture net device?” Dr. Kallas asked.

“Probably not,” Dr. Williams replied. “It probably extends way outside of this current field of view.”

“Right,” Dr. Kallas noted. “And if it simply dematerializes stuff that jumps through, we’d probably not see anything anyway.”

The console lit up with an extremely bright flash. It subsided. Nothing remained.

“Wow. A weapon capable of destroying an entire solar system in seconds,” Dr. Madson remarked.

“Remotely,” Dr. Williams added.

“That’s concerning,” Dr. Nara noted.

“Tell me about it!” Dr. Williams replied.

A faint white glow appeared on the view screen.

“That’ll be the black hole,” Dr. Kallas stated.

“How do they make a black hole out of nothing?” I wondered.

“How indeed,” Dr. Kallas replied.

We heard noise coming from the other console. We turned to watch.

“The attack has been completed,” the Ani stated.

The crowd in the room looked nervous. We assumed the results would arrive in moments.

“All targeted areas have been essentially sterilized,” the Ani stated.

There was a brief pause as the Ani looked down at a data console.

“No new activity has been reported in the last fifteen minutes. We can thus conclude that the action was a success.”

The feed suddenly became rather noisy as attending members made various noises that might have been cheering. They continued to converse loudly with each other.

“Proceedings are adjourned,” the Ani called out.

We watched as the chamber started to empty. Rosral appeared in our lab.

“Ahh, I see you were watching!” she said.

“Yeah!” Dr. Nara replied. “It was very exciting!”

“Do you think we’re out of trouble now?” Dr. Madson asked.

“Let’s hope so,” Rosral replied.

“That’s not very reassuring,” Dr. Williams remarked.

“I think at this point you know about as much as I do,” Rosral replied.

“I think I could use a drink,” Dr. Madson stated.

“You and me both!” Dr. Nara replied.

Chapter 46 Beachhead

I arrived in our lab the following morning to find Dr. Nara already at her workstation.

“Hey, John, come over here. I need you to see this,” she said.

I joined her at her computer. She pointed to her screen. It was an email. From Jen.

Kano,

I need to talk to you and your team urgently. I can’t tell you what it’s about via email. Do you have a place where we can talk in private? I mean completely off-the-grid. Get back to me as soon as you receive this.

Jen

“That looks important,” I stated. “I wonder what’s so secret she can’t tell us in front of the Eilanas?”

“That’s what I’m wondering,” Dr. Nara replied.

“Sounds ominous,” I replied.

“Do you know of anywhere we can talk that wouldn’t be visible to the Eilanas QUERY technology?” she asked.

“No. Not off the top of my head. We have to assume everything we do is being watched at all times. Including this conversation,” I replied.

“Do you think Robert or Riks might have a solution?” Dr. Nara asked.

“Who knows,” I replied. “We can always ask them.”

“What about Rosral?” Dr. Nara asked. “We can trust her, right? Maybe there’s a place on her ship that would be private?”

“You have a point there,” I replied. “I think the less we discuss this the better.”

“Agreed,” Dr. Nara replied. “Let’s try and figure this out when the others arrive.”

I went and got coffee. When I got back the others were there. So was Rosral.

“John, you’re here,” Rosral stated. “I was just telling the others. Our offensive yesterday failed. The superintelligence is back.”

“Wait, what?” I replied in surprise.

“We missed some hubs that were cloaked using mechanisms we didn’t know about,” Rosral stated.

“Again?!?” Dr. Williams exclaimed.

“That’s not the bad part,” Rosral added. “The entities identified where our attacks came from. They’re currently trying to breach our defenses.”

“Defenses?” Dr. Williams asked nervously. “They’re trying to breach our defenses?!?”

“Our sentinel defense system prevents unwanted objects from jumping into the galaxy,” Rosral replied.

“This galaxy?” Dr. Nara asked.

“Yes,” Rosral stated. “The entities are attempting to jump thousands of probes into our galaxy as we speak. They’re trying to circumvent the defense grid.”

“Okay, tell me that circumvention is impossible,” Dr. Kallas said.

“So far, the defenses are holding,” Rosral replied. “Thousands of probes have been successfully dematerialized. But circumvention is possible. It’s only a matter of time.”

“Oh god! We are so screwed!” Dr. Williams replied.

“And what happens when they circumvent the defense shield?” Dr. Madson asked.

“Propagation nodes will arrive in systems in this galaxy,” Rosral replied. “You know what happens after that.”

“So, we just roll over?” Dr. Williams asked.

“Not quite,” Rosral stated. “Defense plans are currently underway. Come, let’s see.”

Rosral translocated us onto the top platform of Seris 14. Several others had already gathered there.

“Look up,” she said.

“I don’t see anything,” Dr. Madson stated.

“Wait a moment,” Rosral replied. “Don’t blink or you’ll miss it.”

We watched and waited. My neck started to get stiff. And then it happened. A fleet of at least thirty Enu dreadnaughts appeared in the skies above us. One after another. They were large enough to be clearly visible to the naked eye.

“Hey, aren’t those the same ships we saw...” Dr. Kallas said.

“Just recently, yes,” Dr. Williams replied. “Oh. That is truly impressive.”

“They’re here as a precaution,” Rosral stated. “The defense shield is expected to hold out for another few hours. We have that time to come up with a solution.”

“Can’t we just nuke the places they’re launching these probes from?” Dr. Madson asked.

“We would have done that already,” Rosral replied. “But we don’t know where they’re coming from. We’ve yet to defeat their new stealth technologies.”

“Can’t we determine their location from trajectories?” Dr. Kallas asked.

“They’re using jump technologies,” Rosral replied. “Those don’t have trajectories.”

“What’s going on up there?” Dr. Nara asked. We looked up. The Enu dreadnaughts were firing.

“They breached the defense field faster than we expected,” Rosral stated.

“They wha...” Dr. Williams started as Rosral translocated us back to our lab. She went to one of our Eilanas devices and brought the ensuing battle up on its console. As suspected, the blue-green glow of a propagation node was plain as day on the screen. We observed the Enu dreadnaughts firing multiple overlapping ion beams at the node. To no effect. The beams were, however, destroying the endless stream of drones emanating from the object.

“Don’t they have more powerful weapons?” Dr. Madson asked. “Ones that go through those shields?”

“They do,” Rosral replied. “But they cannot be used safely this close to a planet.”

“Some of those drones are getting through those lasers,” Dr. Nara observed.

“Yes,” Rosral replied. “But most are being destroyed. That should slow things down until the entity learns how to create drones with shields.”

“It’s a superintelligence,” I stated. “Why hasn’t it already learned that?”

“Perhaps the energy requirements to power those shields are too high,” Rosral replied.

“Perhaps they use small-scale translocation devices to harvest resources and fabricate components, and shields interfere with those mechanisms.”

“Also, it is probably spending a massive amount of energy maintaining its own shield against those ion beams,” Dr. Kallas added. “Less energy for processing cycles.”

“Are those damaged drones going back into the node?” Dr. Madson asked.

Rosral zoomed in. We observed that they were.

“Is that a tractor beam?” Dr. Kallas asked.

“Umm. Yes,” Rosral replied. “Sorry, I didn’t get your reference for a moment. We have a different term for it.”

“Can those drones make it to Beta?” Dr. Nara asked. “And start harvesting this planet?”

“No,” Rosral stated. “They’ll be unable to penetrate our planetary shielding. At least for now.”

“So, they WILL eventually make it through?” Dr. Williams asked.

“Yes,” Rosral replied. “But they’ll likely only try after exhausting other resources in the system.”

Rosral stepped over to an Eilanas device and tuned into a strategic proceeding. It was the tail end of the session, by the looks of it.

“Reports are coming in that almost three hundred inhabited systems are now host to propagation nodes,” the Ani said. “Our Enu and Asin fleets are starting to be spread thin. We’ve already lost five systems to the incursion. Our scientists are still working on a solution to destroying the propagation nodes, and to break the entity’s new stealth measures.”

“This doesn’t look good, does it?” Dr. Madson asked.

“It doesn’t,” Rosral replied. “We’ve never been in a situation like this before. No obvious solutions have presented themselves.”

“Can’t we just, you know, dematerialize that propagation node thingy?” Dr. Nara asked. “Or translocate it elsewhere?”

“Like, into the star, for instance,” Dr. Kallas added.

“We can’t,” Rosral stated. “The node is shielded in a way that would prevent translocation or dematerialization. And we know that because the sentinel defense grid was no longer able to stop it.”

“So, to disable the propagation node, we need a way past its shield?” Dr. Madson asked.

“Yes, but that is not possible,” Rosral replied. “We cannot translocate anything inside it.”

“But we can translocate outside of it?” Dr. Madson asked.

“Yes, but I can’t see why that would help,” Rosral replied.

“I might have an idea. Remember that grey goo planet?” Dr. Madson asked.

“The completely smooth one?” Dr. Nara replied.

“Yeah, that one,” Dr. Madson replied. “Wasn’t it comprised of nanobots that ate everything they touched?”

“It was,” Dr. Kallas replied.

“What if we translocated some of the grey goo nanobots onto a damaged drone?” Dr. Madson replied. “Let it be tractor beamed back into the node. Then the grey good would eat the node from the inside.”

“That grey goo takes too long to work,” Dr. Williams replied. “The propagation node would notice it and eliminate it way before it took hold.”

“Damn, yeah, you’re right,” Dr. Madson replied. “It took, what, twenty minutes to multiply. So, it would take hours or days to eat the thing.”

“A novel idea, to be sure,” Dr. Kallas noted. “Probably the best we’ve come up with, given the circumstances.”

“Yeah,” Dr. Madson replied. “It was worth a shot, eh?”

“Show me this grey goo planet,” Rosral stated.

Dr. Williams accessed a nearby Eilanas device and brought it up on screen. Rosral stepped in and isolated the structure of one of the nanobots teeming on its surface.

“Dr. Williams is correct,” Rosral stated. “These nanobots are unsuitable for the purpose. Not only are they too slow, but the composition of the propagation node is also not conducive to their needs. These nanobots are designed to replicate using organic matter.”

“Like I said, stupid idea,” Dr. Madson replied.

“No,” Rosral replied. “Not stupid at all. We just need a more suitable nanobot. And a method to deploy them onto damaged drones just before they are re-ingested by a propagation node.”

“So, my plan might work?” Dr. Madson asked.

“We can pull this off?” Dr. Kallas asked.

“We can’t,” Rosral replied. “But I think I know someone who might.”

Chapter 47 A return to Esid

Without a word of warning, Rosral translocated us onto her ship.

“Could you at least give us some indication that you’re about to do that?” Dr. Williams whined when we’d arrived.

“Robert is worried about his balls hitting something upon arrival,” Dr. Madson informed Rosral. “Make sure you don’t translocate him too close to the corner of a table,” she continued, winking at Rosral.

“Hey! No fair!” Dr. Williams complained. “Now she’ll do that for sure!”

“Where are we going?” I asked.

“To Esid,” Rosral replied. “I thought you’d have guessed that.”

“The dinosaur anthropologists?” Dr. Kallas asked.

“Yeah, them,” Dr. Nara replied. “Didn’t think of them as that, though.”

“I mean, it’s not a bad description,” Dr. Williams replied.

“Why not just translocate straight there?” Dr. Kallas asked.

“There’s a protective field around Beta,” Rosral replied. “It prevents anything from jumping in or out while the node is there. We’re going to have to fly out of it and then jump. Oh, and by the way, it also means no travel or communications are currently possible with Earth.”

“Not that we care,” Dr. Nara stated.

“Yeah, that place is going to hell,” Dr. Williams added.

“Can you believe we thought the irrationalists were the bad guys?” Dr. Madson stated.

“They are only the bad guys from the perspective of being stuck back on that shithole planet,” Dr. Kallas replied.

“They technically are still the bad guys,” Dr. Nara replied. “In that they’re bad. And mostly guys.”

“Also, this superintelligence isn’t technically a bad guy,” Dr. Williams replied. “It’s just... single-minded.”

“And it’s literally the only thing that can put a stop to those fascists,” Dr. Nara replied. “If we fail here.”

“Let’s just consider the superintelligence as the main antagonist,” Dr. Kallas stated. “For clarity’s sake. Even if it isn’t evil by design.”

Sola, the Eilanas who we’d met a while back when we were first told about the superintelligence threat, appeared on board. She greeted Rosral and they proceeded to rub cheeks several times. They looked very happy to see each other. Sola turned and looked at us. Her eyes narrowed slightly. We got the feeling she wasn’t too pleased to see us.

“We’ll use this ship’s faster-than-light drive to leave the security field and then make the jump to Esid,” Rosral informed us.

“This will be the first time we’ve travelled using a faster-than-light drive!” Dr. Kallas excitedly exclaimed. “I wonder if it’ll look like warp drive on Star Trek?” And while he was excitedly hypothesizing what the experience might entail, the view outside of the ship’s window changed to that of Esid.

“Wait, what? Did I miss it?” Dr. Kallas said.

“No,” Rosral stated. “The faster-than-light portion of the trip took zero point one eight seconds. The remainder of the trip was instantaneous. The ship plotted our course and directly switched between the two modes of transport en-route.”

Two Essan translocated onto the ship as we arrived.

“They came here?” Dr. Williams asked.

“Looks like it,” Dr. Nara replied.

“Oh, thank god,” he exclaimed. “I was NOT looking forward to going back down to that humid, itchy, insect-ridden jungle!”

“Guys, let me introduce our two guests,” Rosral said. “This is Kaano. He’s the Essan you met last time we were here.

Kaano bowed.

“And this is Essii,” Rosral said. “She’s also going to be helping us today.”

Essii bowed.

Essii was a tall and slender Essan female. She had a long, flexible body with a slight tail. Her head was large and broad and her large eyes glowed with intelligence. Her pointed ears were slightly upturned, and she had small, colorful scales running along her body. She also had two horns atop her head and a series of ridges along her spine. Her hands were thin and long with four slender fingers. Overall, Essii exuded a sense of strength and wisdom.

The last time we'd met the Essan, we'd observed them wearing simple garments that matched their at-one-with-nature lifestyle. The two Essan who joined us on Rosral's ship had apparently chosen to dress for the occasion. They were now wearing what looked like decidedly high-tech garb.

Essii was wearing a slim-fitting, dark purple suit that clung to her long and thin body. Her hands were protected by thin and durable gloves. She accessorized with a few colorful wristbands and a necklace of a shiny metal. She also had a small, hovering light above her head.

Kaano was wearing a sleek, black jumpsuit with yellow highlights. Gleaming metal insets with engravings in what we presumed was the Essan written language adorned both of his arms.

We'd gotten used to not automatically shaking hands after our interactions with the Eilanas, the Enu, and the Lanass. We all sort of waved awkwardly and said hi as introductions were made.

"Kaano and Essii have already been informed of the situation, and of our plan," Rosral stated.

“Your nanoreplicator idea has merit,” Essii added.

“Very innovative,” Kaano added.

“Thanks!” Dr. Madson stated. “My idea!”

“Kaano and Essii will design new, more stringent nanoreplicators that favorably interact with the materials the propagation nodes are composed of,” Rosral informed us. “They’ll also design a suitable deployment mechanism and assist us in identifying all targets to infect with the nanoprobes.”

Sola and the two Essan moved to the far corner of the room to start work. Rosral stayed with us.

“This is probably a good time to spill the beans on some stuff I haven’t told you yet,” she stated.

“Stuff you haven’t told us?” Dr. Williams replied.

“Yeah, stuff I haven’t told you. For instance, I told you that we use cybernetic implants to preserve long-term memories,” Rosral stated. “We also have other implants. I have ocular implants that provide me with a heads-up display, and an implant that I can use to communicate with other Eilanas.”

“Are you using that when you look like you’re daydreaming?” Dr. Madson asked.

“Most likely, yes,” Rosral replied.

“Ocular implants sound useful. Can I get some?” Dr. Kallas asked.

“We can see about that later,” Rosral replied.

“Umm. Me too, while you’re at it!” Dr. Williams interjected.

“We also have other implants. Specialized implants,” Rosral stated.

“Specialized how?” Dr. Williams asked.

“Stop interrupting Rosral and let her get on with the story!” Dr. Madson yelled. She slapped Dr. Williams on the arm.

“Specialized implants are only available to certain Eilanas,” Rosral continued. “One example of that is a quantum spacetime inference implant.”

“Wait, you have QUERY as an implant?” Dr. Williams exclaimed.

“Thank about these blue cards,” Dr. Kallas replied. They have QUERY in them. It’s been miniaturized beyond belief.”

“The implant is biological in nature, actually,” Rosral replied. “Powered by the host’s body. The recipients of such implants can view the universe with their minds.”

“Wait. Powered by the host’s body?” Dr. Williams asked.

“Organisms can be quite energy efficient,” Rosral replied. “You’re all probably familiar with how calories are easier to put on than to lose, right?”

“Don’t even get me started,” Dr. Madson replied.

“Implants simply put that excess energy to use,” Rosral replied.

“You’re skinny. Do you have one?” Dr. Madson asked.

“No,” Rosral replied. “It takes years to learn how to use one. I haven’t been through the training. And besides, they’re reserved for only a very tiny fraction of the population.”

“But surely you’d need the implant before you can start learning how to use it?” Dr. Kallas asked.

“There’s more to it,” Rosral stated. “Ahem... This is where you might get mad at me... You see, your theory that quantum spacetime inference might have a write-mode is correct. We use it for translocation, fabrication, and jump drive technologies.”

“Oh my god! I knew it!” Dr. Kallas stated excitedly.

“So, those power systems the Lanass were working on weren’t to study the universe at the Planck length. They were to perform massive QUERY write-mode operations?” Dr. Williams hypothesized.

“Like translocating stars or solar systems?” Dr. Kallas replied.

“Or even galaxies?” Dr. Williams added.

“Not really, but that is tangential to what I’m trying to tell you,” Rosral replied. “Let’s get back on topic. Since QUERY, as you put it, has a write mode, recipients of the implant also gain the ability to restructure spacetime with their minds.”

“This turns out to be dangerous,” Rosral added. “Those who first tested the implant found themselves restructuring matter around them while dreaming. And so, the implants were immediately removed.”

“I can see how that would be a problem,” Dr. Madson stated.

“I have such bad nightmares, I’d probably end up accidentally killing myself,” Dr. Williams added.

“Our scientists searched for an answer. A way to turn the device off under certain conditions. But they never found one,” Rosral added. “The solution to the problem was finally

determined to be a rigorous mental training regimen for those destined to receive the implant.”

“That sounds tough,” Dr. Kallas stated.

“Do you know anyone who does have the implant?” Dr. Madson asked.

“Yes,” Rosral replied. “Sola has one. Her red and white attire is reserved only for those who have such implants.”

“Why didn’t you tell us about QUERY write-mode before?” Dr. Kallas asked. “It would have made a lot of the things we’ve been experiencing more understandable.”

“We would have preferred you not learn about it until you’d learned a lot of other basics,” Rosral replied. “There’s much we still need to teach you. QUERY write-mode is dangerous, and not a functionality to be used or even experimented with lightly. It took us centuries to perform our own first experiments with it.”

“So, do all translocators, jump drives, and fabricators work using QUERY write-mode?” Dr. Williams asked.

“No,” Rosral replied. “They’re implemented in a variety of different ways by different species. Our use of QUERY write-mode is shared by very few races.”

“I think there’s more Rosral wanted to tell us,” Dr. Madson stated. “How about we save our questions until the end.”

“Thank you, Rachel,” Rosral said. “The Essan developed quantum spacetime inference implants a very long time ago. All Essan have these implants. And they are adept at controlling them.”

We glanced over at Sola and the two Essan guests. They were standing around a new console. Well, part of one. We could make out that it was materializing slowly.

“The Essan also have memory implants that contain the combined knowledge of their species dating back millions of years,” Rosral told us. “It includes detailed blueprints and schematics for every device they’ve ever created, including those they used at the very height of their technological superiority. Although plenty of highly advanced races exist today, it is rumored that the Essan achieved a level of technology far beyond anything that exists now. Their achievements were lost to time when they retired.”

“Except not,” Dr. Kallas replied. “They’re using that technology to help us now.”

“That is because they acknowledge the threat we are facing,” Rosral replied. “To be clear, they haven’t helped anyone in over ten thousand years.”

“Nothing like this has happened in ten thousand years?” Dr. Kallas asked.

“No,” Rosral replied.

“Was it us who came along and screwed everything up?” Dr. Madson asked.

“No, you simply arrived at the wrong moment,” Rosral replied. “Anyways, come! Let’s see what they’re doing. It’s always so fascinating to watch.”

We made our way to the corner of the room and watched as the Essan reconfigured spacetime on Rosral's ship. Layer by layer, piece by piece, they fabricated a device in front of them. It was almost done by the time we arrived, and we only saw the last few components slip into place. When they were done, Kaano activated the device. A brilliant holographic representation appeared overhead. Essii turned to us to explain what they had created.

“This device should be capable of doing everything we need,” Essii stated. “We’ll use it to peer inside a propagation device and look at its internals. With that knowledge, we’ll craft suitable nanoreplicators capable of consuming the nodes within seconds. We will then use the device to simultaneously reconfigure the surface of damaged drones on their way back into each propagation node.”

“Let me pull up the locations of all propagation nodes we’ve discovered,” Sola stated.

“No need,” Kaano replied. “We’ve already found them.” He displayed their locations on the holographic console.”

Sola checked the ship’s console. “You found more than we did,” she stated.

“Wait, wasn’t that search performed by, like, all alliances combined?” Dr. Kallas asked.

“It was,” Rosral replied.

“I’m beginning to see why you kept in touch with these folks,” Dr. Madson stated.

“We’ll need to coordinate this with your fleets,” Essii stated. “They’ll need to be firing at the drones when we implement this plan so that damaged ones return to the propagation nodes.

|Oh, and you’ll need to redeploy some fleets to nodes you missed in your own scans. Also, you’ll want a way of mopping up the resulting nanoreplicators. You won’t want them floating onto anything nearby. They’re quite voracious.”

“Those ion beams should do the trick,” Kaano stated.

“Let’s head back to Beta,” Rosral stated. And in a flash, we were back in orbit of Beta. The propagation node filled the viewport adjacent to the room we were occupying. I felt like we might almost be able to reach out and touch it.

“Ummm. Rosral?” Dr. Nara asked. “Aren’t we a little close...”

Rosral, Sola, Essiii, and Kaano vanished. Presumably to go meet with fleet coordinators.

“Guys?” Dr. Nara stated. “I’m a little worried about our proximity to that... thing.”

“Me too,” Dr. Kallas added.

“I mean, yeah, this feels a little close for comfort,” Dr. Williams replied. “But Rosral must know what she’s doing. Right?”

“Does anyone know how long they’ll be?” Dr. Madson asked.

A thick orange ion beam streaked past the window of the ship. Followed by another. Drones streamed out of the blue-green glowy propagation node right in front of our eyes.

And then we noticed a twitching, damaged drone floating towards the window.

“Oh god oh god! That thing’s going to come through the window!” Dr. Kallas exclaimed. We all braced.

It bounced harmlessly off the membrane without so much as a sound and then slowly headed back in the opposite direction.

“Who needs a change of underpants now?” Dr. Williams chuckled.

“That’s not at all funny!” Dr. Kallas yelled.

“Should we at least try to figure out how to back this ship up a bit?” Dr. Madson asked.

None of us answered. Dr. Madson looked at Dr. Williams.

“Don’t look at me! I’m not going anywhere near that console!” he stated. “And besides, you’re the one with the driver’s license!”

“So, what, we’re going to sit here just a few meters from the thing that’s probably going to destroy the entire universe while we wait for those guys to have a nice chat back on Beta?” Dr. Kallas stated nervously.

“To be honest, there’s not much else we can do, is there?” I replied.

And so, we sat and waited in silence. They didn’t return. Dr. Williams pulled his blue card from his pocket and started browsing. We all did the same thing.

“No internet,” Dr. Kallas stated.

Several more ion beams streaked past the window. The sound they made as they passed was a like a low metallic hum. And very loud. We flinched every time one passed.

“They’re going to hit this ship eventually, aren’t they?” Dr. Madson said.

“Autotargeting?” Dr. Williams reminded us.

“Autotargeting my ass,” Dr. Nara replied. “Look how big those beams are!”

“Surely this ship is shielded against those?” Dr. Madson said.

“Who knows?” Dr. Kallas replied.

“I could really use a drink,” Dr. Madson stated.

“Do you think it’s wise, given the circumstances?” Dr. Kallas asked.

“Why not? It’s not like we’re helping these people,” Dr. Nara replied. “We’re just kinda watching and hoping everything turns out well.”

“And hoping that we’re not all assimilated by a super AI by the end of the day,” Dr. Kallas added.

“I mean... It can’t hurt... Right?” Dr. Madson stated.

“If I’m gonna go, I’d rather it be while I’m drunk,” Dr. Kallas stated.

“That’s the spirit, Riks,” Dr. Williams replied, sarcastically.

“Fuck it,” Dr. Madson stated. She pulled out her blue card and materialized a two-liter bottle of sec and five glasses. “A decision has been made.”

She poured us all drinks and handed them out.

“I, for one, thank you for making that important decision,” Dr. Kallas stated.

Dr. Nara finished her drink in one go and handed the glass back to Dr. Madson, who poured her another. “Here’s to the end of the world!” Dr. Nara stated as she lifted her newly filled glass in front of her.

“And the end of the universe!” Dr. Madson replied. They tapped their glasses together.

“This stuff has quite a kick, doesn’t it!” Dr. Williams stated.

“Drink up, Robert! There’s more where that came from!” Dr. Madson replied while materializing another bottle.

We sat in silence and drank for a moment.

“Oh hey, Rachel, you were married?” Dr. Kallas asked.

“Oh god, don’t get me started on that episode!” Dr. Madson replied.

“Was it really that bad?” Dr. Kallas replied.

“It was a massive mistake,” Dr. Madson replied. “Straight out of a fucking rom com. Can’t believe I fell for that shit.”

“I concur,” Dr. Williams added.

“I went back to our small hometown for the holidays and was swept away by this rugged, flannel-wearing guy I’d known in high school. We got married quickly and I almost quit my career to move back there. Luckily, I figured out he was an asshole...”

“Oh god, really?” Dr. Kallas replied.

“Yeah, I know, right?” Dr. Madson replied. “Sooo cliché...”

“How long did it last?” Dr. Kallas asked.

“About a year,” Dr. Madson replied. “A year of my life wasted.”

“Just think, if you’d quit your career, you wouldn’t be here staring at that... thing,” Dr. Nara stated, pointing to the ominous glowing propagation node.

“Honestly,” Dr. Madson replied. “I’d choose being here over being with that asshole any day of the week.”

“Anything you’d have like to have done before you died?” Dr. Nara asked us all.

“I’d like to have seen more of Beta,” Dr. Kallas replied. “Visit the eastern continent, at least.”

“I feel like I’ve done a lot more than most people, what with us meeting an alien race and moving to their planet and all,” Dr. Madson replied. “But there are thousands of species and habitats I’d still like to have studied.”

“I’d like to have learned about this new research the Eilanas are doing,” Dr. Williams replied.

“That and maybe get friendly with more of the local researchers. Exchange notes, that sort of thing.”

“This can’t really be the end of the story, can it?” I replied.

And just then, our colleagues returned.

“You’re drinking without me?” Rosral exclaimed. “How rude!”

“You weren’t here!” Dr. Madson replied. She was already slurring her words a little.

“We were only gone five minutes,” Rosral stated.

“Has it really only been five minutes?” Dr. Williams asked. His words were also slurring a little. “It felt like five hours!”

“We were all worried about the AI death machine just outside that window.” Dr. Kallas stated, pointing out of the window.

“Oops, sorry,” Rosral stated. She hurried over to a console, and we watched as the ship backed away and the propagation node subsided into the distance.

“Is that why you’re all drinking?” Rosral asked.

“Well, yeah,” Dr. Nara replied. “That, and the internet wasn’t working.”

“You humans get so easily bored,” Rosral noted. “Anyway, the attack is commencing now if you want to see.”

And so, we watched. It took a moment for damaged drones infected with the nanoreplicators to return to the propagation node. Following that, we saw the blue-green glow dim out. Finally, and rather suddenly the node sorta just evaporated right in front of our eyes. Enu warships turned their ion cannons on the resulting dust.

“Was that it?” Dr. Madson asked, clearly more than a bit drunk.

“Not quite,” Rosral replied. She turned on a viewscreen in the cabin. It was tuned to strategic command. We drank more Sec and watched as confirmation arrived that the propagation nodes in other systems had indeed been eliminated in a similar fashion.

“Sounds like a success.” Dr. Kallas stated. “Yay?”

“How much exactly have you guys had?” Rosral asked.

“You try spending fifteen minutes next to that... death ball,” Dr. Williams replied in very slurred words.

“Yeah! We all thought we were goners,” Dr. Kallas added in equally stuttered speech.

“Their survival instincts leave a lot to be desired,” Essii stated.

“Don’t fault them too much,” Rosral replied. “They’re new to this.”

I don’t recall anything else from that encounter. I asked Rosral about it when writing this up and she told me that I’d rather not know. Suffice as to say, Rosral had thanked the Essan for their help. They had apparently agreed to stay with us to monitor the situation and provide assistance. She also told me that they’d speculated that this might not be the end of the situation and that new tactics may be required should the artificial superintelligence arise once more.

We woke up in our habitation spaces the next morning. Earth morning. It was turning to evening on Beta. It had been our second rather embarrassing situation in front of the Eilanas. Rosral was probably used to it by now. But Sola, Kaano, and Essii probably had their own opinions. Opinions we rather preferred they’d not share with us.

The immediate threat to Beta had subsided and life slowly returned to normal. If anything, the night festivities held during that Vedess evening were much louder and livelier than we had remembered. We hypothesized that we might just be witnessing the Eilanas celebrating. Which was strange. Security protocols were eventually lifted, and we turned to look at what was happening back on Earth.

We met in our gardens that morning, sort of by chance.

“I don’t know about the rest of you, but I’m having a day off,” Dr. Madson said.

“That sounds like a good idea,” Dr. Kallas replied.

“Yeah, time to take it easy,” I replied. “I think last night proved that we’ve been under too much stress.”

“The great shaming,” Dr. Kallas replied.

“Oh god, don’t even,” Dr. Nara added, sipping a cup of Oress.

“Do you like that stuff?” Dr. Williams asked.

“Yeah, it’s calming!” Dr. Nara replied.

“Are you secretly one of them?” Dr. Kallas asked.

“Wha? Oh! No! I just like to have a herbal tea every now and then,” Dr. Nara replied. “No secret alien conspiracy here!”

“I heard the link communications with Earth are back up,” Dr. Madson stated. “Now that the invasion is technically over.”

“Anyone checked on the Earth situation yet?” I asked.

Everyone shook their heads. Not surprising, really, given what we'd just been through.

"We should probably check," Dr. Kallas stated. "It's been a few days."

We all pulled out our blue cards and started browsing. Like the good old days. A bunch of people sat around together, glued to their gadgets, not paying attention to each other.

"Looks like most of the internet and power on Earth has now been restored," Dr. Kallas stated.

"Yep. People are back to posting selfies and shit," Dr. Nara added. "And presumably doomscrolling social media feeds."

"What, like us?" Dr. Kallas replied.

"Wait. Holy crap. Have you seen this?" Dr. Madson exclaimed.

We all looked at Dr. Madson's blue card output as she pulled up a breaking news segment.

BREAKING NEWS:

In a shocking and unprecedented move, an armed militia group known as The American Patriot Front has seized control of the United States government. In a swift and brutal attack, they seized positions in the Capitol, Camp David, Andrews Air Force Base, and the Pentagon. Additional reports suggest that the Presidential bunkers and safe houses across the capital have also been taken.

The fate of the standing President and many of his senior staff remain unknown at this time, although there are reports of politically motivated assassinations and public execution of those in power.

In a statement released shortly after their takeover, The American Patriot Front promised a new era of freedom and justice for the American people. They declared to be "dedicated to the preservation of liberty and the protection of the Constitution of the United States of America".

The United States is now struggling to go through a potentially dangerous transition of power and the international community is watching closely to see what comes next.

This is a breaking news story. We will continue to bring you further updates as they become available.

“The irrationalists are now in control of the US nuclear arsenal?” Dr. Williams posited.

“I’d imagine so,” Dr. Kallas replied.

“Oh, this is bad. This is very bad!” Dr. Williams stated.

“It gets worse,” Dr. Nara added. “Check this out.”

Good evening, this is Tom Shepperd with breaking news.

Today, the American Patriot Front, a far-right extremist group, who took control of the United States government in a shocking coup just days ago is calling for an immediate war on China, which they blame for the global COVID-19 pandemic and have accused of orchestrating terrorist attacks against critical US internet and energy infrastructure.

The group's leader, who goes by 'The Shaman', issued a statement shortly after the coup, proclaiming that the United States is now at war with China and will take whatever measures necessary to ensure its citizens are safe.

The US military, who have not yet responded to the situation, have been put on high alert and are reportedly preparing to deploy forces to confront the Chinese.

The rest of the world has reacted with shock and dismay to the news, with many world leaders condemning the coup and calling for peace. It's a tense situation, and one that could have major implications for the already fragile global economy.

Stay tuned for updates as we continue to monitor this developing situation.

“Okay, we missed a lot,” Dr. Kallas stated.

“Apparently so,” Dr. Madson replied.

“Looks like there have been major riots in many European cities, too,” Dr. Nara stated.

“Some governments have been overthrown. Others who were already controlled by fascist interests seem to be supporting the new US government in their call to attack China.”

“What a time to have lost our internet connections,” Dr. Williams stated.

“Yeah, tell me about it!” Dr. Nara replied. “All this stuff happened in the space of a couple of days.”

“Funny how we resolved a threat to all life in the universe while on Earth, things continued to go to hell,” Dr. Kallas stated.

“Resolved and resolved,” Dr. Williams replied. “I mean, we were there. But we didn’t exactly help.”

“Rachel was the one who came up with the solution!” Dr. Nara stated.

“Granted. But in the end, we all just got drunk,” Dr. Kallas replied.

“Those were extenuating circumstances,” Dr. Madson replied. “Even Rosral could see that. I mean, she moved the ship as soon as she noticed!”

“It would have been nice if she’d noticed before she left us there to shit ourselves,” Dr. Kallas replied.

“Speak for yourself,” Dr. Williams stated.

“I wonder what will happen next?” Dr. Madson said. “On Earth, I mean.”

“God only knows,” Dr. Kallas replied. “I’m glad we’re safe here.”

“Oh god! Jen’s request!” Dr. Nara exclaimed. “I almost completely forgot about it!”

“Jen’s request?” Dr. Williams replied.

“Jen contacted me. She wants to talk to us in private. Like completely off-the-grid. I was meant to reply to her email, but we got distracted by, well, all this shit,” Dr. Nara replied.

“A way to talk completely off-the-grid?” Dr. Kallas stated. “Interesting.”

“Do you know a way of doing that?” Dr. Nara asked.

“No,” Dr. Kallas replied. “Not at all.”

“Me neither,” Dr. Williams replied.

And then Rosral appeared.

Chapter 48 An existential threat

“I thought you’d be in the lab,” Rorsal stated.

“Nah, we decided to take the day off,” Dr. Madson said.

“Sorry to ruin your plans, but there’s something I need to show you,” Rosral replied.

“Now?” Dr. Williams replied. “Can’t it wait?”

“No,” Rosral replied.

A moment later we were, once again, standing on her ship.

“Looks like you got interrupted again, Kano,” Dr. Madson stated.

“Yep,” she replied. “The story of my life these past few weeks. Hope Jen isn’t in too much of a hurry.”

Rosral directed us to the console the Essan had materialized a few days prior. The bright holographic display appeared to depict an entire galaxy.

“Watch the display closely,” Rosral informed us.

“Wait, am I seeing this correctly?” Dr. Kallas asked. “It’s gradually getting dimmer. Like, stars are disappearing.”

“Correct, Dr. Kallas,” Rosral replied.

“What is causing this phenomenon?” Dr. Williams asked.

Kaano zoomed in on a portion of the galaxy. The phenomenon was much easier to appreciate at this resolution. We watched as star after star blinked out in real time. He zoomed in again, this time to a star. Trillions of objects were swarming around it.

“Wait,” Dr. Williams stated. “Is this what I think it is?”

“The superintelligence is back?” Dr. Kallas asked.

“You’re both correct,” Rosral replied.

“The previous superintelligence somehow survived our attack,” Kaano stated. “And learned from our nanoreplicator strategy. It also learned how to reconfigure matter. Its new strategy involves the use of particles that can communicate collectively. And they have jump capabilities. They can travel anywhere in the universe instantaneously.”

“How large are these individual particles?” Dr. Kallas asked.

“Not much larger than a grain of sand,” Essii stated.

“How can a machine of that size store so much information?” Dr. Williams asked. “It shouldn’t be possible based on the laws of physics.”

“They don’t individually contain much information. The knowledge of the superintelligence is redundantly distributed across its entire collective,” Sola replied.

“Sort of like a bit torrent?” Dr. Nara asked.

“They won’t know what that is,” Dr. Williams replied. “But yeah, sort of like a bit torrent.”

“So, destroying some won’t wipe out any of the superintelligence’s knowledge?” Dr. Madson asked.

“Correct,” Kaano replied. “Over ninety percent of the particles would need to be destroyed to have any effect on its knowledge base.”

“This new superintelligence doesn’t seem to care about stealth,” Essii replied. “It is simply relying on expansion at a super-exponential rate.”

“Where is this galaxy?” Dr. Nara asked.

“It is a very long way off,” Rosral replied. “Far outside our observable universe. And yours.”

“How quickly is it consuming those stars?” Dr. Kallas asked.

“In the last Earth hour over a million stars were consumed,” Rosral replied.

“So, what this is a four-point-zero version of the superintelligence?” Dr. Williams asked.

“More like version four thousand-point-zero,” Dr. Kallas replied.

“Wait, don’t stars go supernova when they lose enough mass?” Dr. Nara asked.

“Usually, yes,” Kaano replied. “These particle swarms are consuming the stars so quickly, there simply isn’t enough time for the necessary reactions to happen.”

“This may not look like much to you,” Essii stated, “but we estimate it will take just a few days for the entire universe to be consumed by these particles. At their current expansion rate.”

“Not during our long-recorded history has a superintelligence ever been allowed to re-emerge so many times,” Kaano added.

“Is there a way to stop this?” Dr. Madson asked anxiously.

“Not that we know of,” Essii replied. “Tracking the particles is simply infeasible.”

“Can’t we encase that galaxy in a time-dilation thingy?” Dr. Nara asked.

“That won’t work,” Sola replied. “Each particle has jump capabilities. They would all simply leave.”

“So, we’re screwed?” Dr. Kallas asked.

“Screwed?” Dr. Williams replied. “Screwed doesn’t even come close.”

“Not yet,” Kaano replied calmly. “We don’t have an obvious solution to this problem. But we know someone who might.”

Essii and Kaano stood facing each other. A new device started to materialize piece by piece in between them. We watched, mesmerized.

“Wait, there’s someone out there more advanced than the Essan?” Dr. Williams asked.

“I’m not aware of such a race,” Rosral replied.

“Me neither,” Sola added.

“They’d better hurry up with that device,” Dr. Madson stated. “Look, that galaxy is almost totally gone already.”

“Do you guys need a drink to pass the time?” Rosral asked.

“Oh. Ha. Ha,” Dr. Kallas replied.

“You gotta hand it to Rosral, though,” Dr. Williams added. “That quip was pretty spot-on.”

“If I didn’t know any better, I’d think the Essan were wizards or sorcerers,” Dr. Nara stated.

“Conjuring things with their minds and the like.”

“I wonder if that’s where those myths come from?” Dr. Madson posited. “Ancient visitors on Earth with QUERY write-mode implants.”

“I mean, that would be handy for turning water into wine,” Dr. Kallas replied.

We continued watching. As every second passed, more stars blinked out on the holographic projection. And the device the Essan were working on slowly became more complete. Every passing moment felt like hours. Dr. Nara pulled her blue card out and started browsing. We all followed.

“Look at you lot,” Rosral commented. “As soon as you’re not entertained for a couple of seconds you start with the browsing.”

“I bet you do it too,” Dr. Kallas replied.

“With your ocular implants,” Dr. Williams added, “so we can’t see.”

“Okay, okay, you’re right,” Rosral replied.

“Holy. Crap. Guys,” Dr. Nara stated. We stopped browsing and turned to her. She played a breaking new story on her blue card.

This is an urgent breaking news update.

Today, the United States administration has launched multiple nuclear missiles at China, in what appears to be an act of unprovoked aggression. China has retaliated by launching their own missiles back at the United States.

At present, world leaders are calling for an immediate de-escalation of the situation, as some fear this could be the start of a deadly global conflict. The full repercussions of such an event remain unclear, but it some scientists fear we may be on the brink of a potential extinction-level event.

Our sources on the ground are reporting immense panic and confusion, as citizens across the globe brace themselves for the worst.

We'll keep you updated with the latest developments as they unfold.

We watched the news cast with utter disbelief.

“World War Three,” Dr. Kallas commented.

“I can’t believe how quickly things escalated,” Dr. Madson replied.

“There goes the neighborhood...” Dr. Nara joked.

“You know what’s bizarre?” Dr. Williams stated. “We’re watching both the end of the world and the end of the universe happen simultaneously.”

“It’s not like we could have done anything to stop it,” Dr. Nara replied. “We asked for their help time and time again. And nothing.”

“They did say they want to see if our species will come out the other end of the process,” Dr. Madson replied.

“Looks like they won’t,” Dr. Kallas stated. “Perhaps they were correct to wait all along.”

“What does this mean for us?” Dr. Nara replied. “Are we going to be the last humans alive?”

“Not if this swarm thing has its way,” Dr. Madson stated.

A humming sound came from behind us. We all turned around. The Essan had finished their device. It was a disc-shaped console. Kaano had just activated it. It hovered above the ground at about waist-height to the Essan.

Essii and Kaano interacted with the device. And the view suddenly changed out of the ship’s window. All we could see was total darkness. We approached the view port and looked out. Not even the faintest glimmer of a star could be seen.

“Am I seeing this right?” I asked.

“No stars?” replied Dr. Kallas.

“Yeah, “I replied.

“I’m not seeing any either,” Dr. Williams stated.

“Then what are we looking at?” Dr. Kallas asked. “I’d expect to be able to observe stars even in the deepest of voids between galaxies. In fact, those are some of the best light shows I’ve seen.”

“I might have hypothesized that we’re inside a singularity, but I doubt even this ship could survive the gravitational stresses associated with being in such a location.” I replied.

“So, Rosral, tell us why we don’t see any stars.” I asked.

Rosral turned and looked at me. Her eyes narrowed slightly. “I have no idea what’s going on. Perhaps we should ask the Essan...”